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IN THE

Supreme Court of the United States

October Term, 1969

No. 1559

STOCKHAM VALVES AND FITTINGS, INC.,

Petitioner,

versus

ARTHUR J. SCHMITT FOUNDATION and MORRIS BEAN & COMPANY,

Respondents.

PETITION FOR WRIT OF CERTIORARI TO THE UNITED STATES COURT OF APPEALS FOR THE FIFTH CIRCUIT

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Petitioner, Stockham Valves and Fittings, Inc. ("Stockham") prays that a Writ of Certiorari issue to review so much of the judgment of the Court of Appeals for the Fifth Circuit in the above-entitled case as adjudges valid U.S. patents Nos. 2,991,267 and 2,914,823* (the "Bean patents") issued July 4, 1961 and December 1, 1959, respectively.

Opinions Below

The opinion of the Court of Appeals is reported at 404 F.2d 13, 159 U.S.P.Q. 705, and is reprinted in the Appendix

* The '823 patent covers a product (shell mold) made from the composition covered by the '267 patent (resin-coated sand); the questions of validity with respect to both are identical. Accordingly, this petition will discuss only the asserted inventive subject matter of the '267 patent.

hereto at pages A1-A2*. The opinion of the District Court for the Northern District of Alabama is reported at 292 F. Supp. 893, 151 U.S.P.Q. 474, and is reprinted in full at A6-A41.

Jurisdiction

The judgment of the Court of Appeals was entered on November 22, 1968 (A4). A timely Petition for Rehearing En Banc, with respect to so much of the judgment of the Court of Appeals as upheld the validity and infringement of U.S. patents Nos. 2,991,267 and 2,914,823 was filed on December 20, 1968 and subsequently denied on February 9, 1970 (A5-A6). This Court's jurisdiction is invoked pursuant to 28 U.S.C. § 1254(1).

Questions Presented

This Petition presents issues which are significant with respect to the uniform interpretation and application by the courts of the patent laws of the United States:

Has the Court of Appeals for the Fifth Circuit, in holding valid U.S. patents Nos. 2,991,267 and 2,914,823 here in suit, failed to apply in this case the mandatory standard of invention prescribed by this Court in *Graham* v. *John Deere Company*** ?

Neither the District Court, in a lengthy opinion, nor the Court of Appeals, in its *per curiam* summary affirmance of the District Court, have ruled on, discussed, referred or otherwise adverted to two strikingly pertinent prior art references on which Petitioner placed great reliance below, both of which merit the most earnest consideration as *anticipating* the patents in suit and, *a fortiori,* cast serious doubt on the validity thereof for obviousness.

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* Appendix to this Petition for Certiorari so indicated herein.
** 383 U.S. 1 (1966).

Secondly, has the lower courts' failure to rule on these prior art references, which were most vigorously brought to the courts' attention, deprived Petitioner of a full and fair trial on the most pertinent and material issues in this cause and resulted in the wrongful withdrawal of technology from the public domain?

If the assumption can properly be made that the lower courts' silence with respect to material evidence is indicative of their failure to consider such evidence, should not this Court exercise its supervisory jurisdiction under Rule 19(1)(b) of the Supreme Court Rules and review the case to prevent a miscarriage of justice?

Statutory Provisions Involved

United States Code. Title 35

"§ 102. Conditions for patentability; novelty and loss of right to patent

A person shall be entitled to a patent unless—

• • •

(b) the invention was patented or described in a printed publication in this or a foreign country, more than one year prior to the date of the application for patent in the United States, or

• • •

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or . . ."

"§ 103. Conditions for patentability; nonobvious subject matter

A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as

a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made."

Introductory Statement and Reasons for Granting Writ

This arduous and protracted litigation was commenced on August 6, 1963 by the filing of a complaint charging Petitioner with infringement of four United States patents including the two Bean patents for which this Court's review is now sought. Petitioner has been held to have incurred no liability with respect to the remaining two patents, Nos. 2,706,163 and 2,706,188, the former having been held invalid (A42, par. 4) and the latter not infringed by Petitioner (A42, par. 3). The District Court, in upholding the validity of the Bean patents, substantially adopted *in toto* Respondent's (Plaintiff's) proposed findings in an opinion which failed to reflect that the Court had made an independent detailed examination of the prior art as required by this Court in *Graham* v. *Deere.*

The diversion of the District Court's attention from the significance of the prior art can be attributed to its acquiescence in Respondent's contention about the number of references relied upon by Petitioner, the Court stating "The citation of a large number of prior patents and publications is evidence of the weakness of the contentions as to invalidity" (A33-A34). But reference to Petitioner's main brief in the District Court reveals reliance on only *seven* patents or publications on the issues of novelty and obviousness applicable to the Bean patents.

What is most frustrating to Petitioner is the inexplicable fact that despite making copious findings, including detailed findings with respect to prior art which was not even relied upon by Petitioner in its brief, the District

Court made no reference to the two *directly anticipating* foundry prior art references on which Petitioner placed primary reliance, *The British Foundry Trade Journal* (A66) and the *Less et al.* U.S. patent No. 2,662,067 (A64).

We are perplexed by the fact that although the prior art and undisputed facts in connection therewith, largely documentary and not seriously in dispute, compel a reasonable conclusion that the District Court's decision sustaining the validity of the Bean patents was erroneous, the *per curiam* summary affirmance of the Court of Appeals reflects no independent consideration or comment with respect to the evidence in this case. Nor was Petitioner successful in its attempt to obtain a ruling on this evidence by its Petition for Rehearing En Banc * which the Fifth Circuit Court held for almost *fourteen months* and then denied without comment (A5-A6).

We believe that the failure of the lower courts to rule on material evidence bearing on the issue of patentability is plainly contrary to this Court's mandate in *Graham* v. *Deere*, *supra*, with respect to the tests of invention to be applied in resolving questions of patentability and has deprived Petitioner of a full and fair trial on the most pertinent issues in this litigation.

As a practical matter, the standard of invention set forth in *Graham* v. *Deere* provides a yardstick by which a patent may be measured against the prior art, thereby providing both the litigants and the courts a firm basis for determining patentability in an area which is otherwise painfully subjective. In theory, if the *Graham* tests are properly applied by the courts, there accrues the intrinsic benefit of a uniform standard of patentability for all of the circuits, the failure of which seriously affects the administration of a single patent law throughout the United

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* Petition for Rehearing En Banc reprinted in pertinent part at pp. A44-A58.

States and encourages the practice of "forum shopping" among the circuits.

We recognize that the sheer volume of the record * in this case which involved issues of validity, infringement, and misuse with respect to four patents necessarily placed a great burden on the courts in their efforts to resolve these issues. The fact remains, however, that the interests of justice require that the litigants in large cases be assured of as thorough a review of the evidence presented as that which is necessarily more readily obtainable in smaller cases.

We believe that the pertinence of the prior art references discussed hereinbelow with respect to the validity of the patents in suit will be immediately apparent to this Court and will present the Court with an opportunity to demonstrate, in practical application, the standard of invention enunciated in *Graham* v. *Deere* and, further, we submit, an opportunity to correct an injustice in the result of this case.

Statement of Facts

This action alleging infringement by Stockham of four United States patents, all of which relate to foundry molding compositions and processes, was commenced, jointly, by Respondents, Arthur J. Schmitt Foundation ("Schmitt"), an Illinois corporation, and Morris Bean and Company ("Bean"), an Ohio corporation engaged in the foundry business which owns the two Bean patents, Nos. 2,991,267 and 2,994,823, as to which Petitioner now seeks review. Neither of the Schmitt patents are brought before this

* Trial of the issues in the District Court required about eight and one-half weeks and encompassed about 7,000 pages of trial testimony, numerous additional testimony in the form of depositions and over four hundred trial exhibits; the printed record on appeal, excluding briefs, ran over 2,100 pages.

Court by this Petition, patent No. 2,706,188 having been found not infringed by Petitioner and patent No. 2,706,163 having been adjudged invalid. Petitioner, Stockham Valves and Fittings, Inc. ("Stockham"), is engaged in the foundry business in Birmingham, Alabama and purchases *resin-coated sand* for use in making shell cores and valve bodies from Reichhold Chemicals, Inc., which has indemnified Stockham and is bound by the judgment of validity of the patents below (A8, par. 6).

All four of the patents in issue below, and specifically the two Bean patents, reflect developments which have evolved in the foundry industry since World War II. Prior to World War II, foundry casting molds were generally made from "green sand" molding compositions, so called because of the presence of moisture in the mixture which gave it the consistency of damp beach sand (A8, par. 7). This molding composition consisted of a wet mixture of refractory granules such as sand, alumina (alundum) or zirconia, which were mixed with a binder such as a clay-water binder, or other suitable binders. In making these molding compositions, it was basic foundry practice to be sure that the individual refractory granules were *coated with the binder** for the purpose of achieving uniform distribution of the binder and preventing segregation or dusting of the binder away from the refractory granules (906a-907a).**

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* This basic practice in the foundry art was not at all referred to in the District Court's Findings of Fact although it obviously weighs upon the question of the inventive concept of doing the same thing with a *dry* molding composition nor was it referred to in the Court of Appeals' *per curiam* affirmance of the District Court.

** Petitioner's Certified Record so indicated herein.

The Croning Process

At the end of World War II, United States experts in occupied Germany learned of a significant discovery there in the manufacture of molds for the casting of molten metal (A8, par. 8). The inventor of this process was Johaness Croning (the "Croning" or "C" process) whose process for "shell molding" revolutionized the foundry art. The Croning process which became widely known in this country by about 1949-1950 (877a-879a; 939a; 914a), was characterized by a co-inventor of one of the Schmitt's patents as "dramatic" and "tremendous" and by Petitioner's expert witness, as the greatest advance in the foundry art in centuries (998a).

In the Croning process, as opposed to the wet or "green sand" method, a *dry*, free flowing molding composition was used. The binder in the molding composition was a heat hardenable (thermosetting) phenolformaldehyde resin which hardened when heated by contact with the hot pattern; this is in contrast with the clay and water binder used in the "green sand" method. Croning used a molding composition which consisted of a mixture of dry sand and powdered phenolformaldehyde resin containing a hardening agent, hexamethylenetetramine ("hexa"), which when applied to a hot pattern, partially thermosets the resin which, in turn, binds the sand grains together to form a sand-resin shell that conforms to the shape of the pattern. The shell is then cured in an oven to impart to it sufficient hot strength so that molten metal can be poured into the shell and, before the shell disintegrates from the heat, the metal becomes molded into the desired shape (A8-A9, par. 8).

The Croning process found quick acceptance by the industry in the United States, particularly at the Ford Motor Company, which was the pioneer developer of the shell molding process in this country (903a-904a), and which initiated in late 1949 a program designed ultimately

to replace the old "green sand" process completely with the new shell molding process.

The Croning shell molding process, revolutionary as it was, posed problems which were quickly recognized in the industry: its major drawback was that the difference in density between the lighter resin particles and the heavier sand grains caused the resin and sand to separate or segregate so the resin became unevenly distributed in the dry mixture (A9, par. a). The solution to this problem, however, lay in the old "green sand" process in which the *individual* refractory granules were *coated* with the clay and water binder to insure an even distribution of particle and binder throughout the mixture. An example of this basic practice is reflected in a brochure published by the National Engineering Company, the manufacturer of the most widely used mulling (mixing) machine in the foundry industry, which pointed out in 1948 that it was extremely important to obtain "even and equal bond distribution covering each sand grain", and that uniform coating of the bond "will make a good casting" (186sa).* Mr. Simpson, president of National Engineering Company gave testimony (906a-907a) that their mixing machine is used to "coat sand grains using a mixture of clay and water" and that "the general idea is to surround each grain of sand with an envelope of clay and water".

Foundry Trade Journal Article

Similarly, and of critical importance in this appeal, in the *Foundry Trade Journal* (A66) in England, more than a year before the filing of the Bean patents, there was disclosed the foundry practice of resin-coating sand grains

* Petitioner's Supplemental (Vol. VII) Certified Record so indicated herein.

by a solvent coating method, under the title "Coated Moulding Sand". The product of the *Foundry Trade Journal* is strikingly similar to that of the Bean '267 patent. In the *Foundry Trade Journal* the refractory granules used are sand (A66, p. 485); in the Bean '267 patent one of the refractory materials used is also sand granules (A58, col. 2, ll. 31-3); in the *Foundry Trade Journal* the thermosetting resin used is wood resin (A66, p. 485); in the Bean '267 patent one of the thermosetting resins described is also wood resin (A58, col. 6, ll. 72-5); in the *Foundry Trade Journal* the resin-coated refractory granules are so dry that they are described as being "similar to dry silica sand" (A66, p. 486); the resin-coated refractory granules used in the Bean '267 patent are also described as "dry" (*i.e.*, non-sticky) (A58, col. 2, l. 35). Even the method described in the *Foundry Trade Journal* for making resin-coated refractory granules (A66, pp. 485-6) is the same solvent coating method described in the Bean '267 patent (A58, col. 3, ll. 12-18).

Less et al. U.S. Patent No. 2,662,067

Similarly, the *Less et al. '067* patent (A64), the effective filing date of which is December, 1949 *, teaches that the resin segregation problem inherent in the present process can be avoided by coating the resin on the sand, *i.e.*, using a dry, free flowing resin-coated sand rather than a dry, sand-powdered resin mix (A64, col. 1, l. 4 to col. 2, l. 8; col. 2, ll. 25-34). Less employed a "wetting agent" method in which the sand grains are first moistened using a wetting

* The Less '067 patent, being an earlier-filed (December 27, 1949) patent, is unquestionably prior art with respect to the Bean '267 (filed December 4, 1950) patent. 35 U.S.C. Sec. 102(e); *Application of LoPresti and Salmons*, 333 F. 2d 932 (C.C.P.A., 1964); *Hazeltine Research, Inc.* v. *Brenner*, 382 U.S. 252 (1965); *Piel Manufacturing Company, Incorporated et al.* v. *George A. Rolfes Company et al.*, 363 F. 2d 59 (C.A. 8, 1966); *In re Zenitz*, 333 F. 2d 924 (C.C.P.A., 1964).

agent (adhesion agent), and then powdered phenol-formaldehyde (thermosetting) is mixed in, such that the powdered resin adheres tightly in a thin coat around the sand grains (A64, col. 3, ll. 30-43). The resin-coated sand is described as being dry and "entirely free flowing" (A64, col. 2, ll. 25-34), and the "formation of dust is almost entirely eliminated" (A64, col. 2, ll. 6-8).

The Abrasive Art

The solution to the problem of resin segregation in a sand-resin mixture was also to be found in a separate but closely related field, the *abrasive* art. This art, in which sand or other refractory (alundum) particles are bound together with a resin binder to form grinding wheels, utilizes materials and methods strikingly similar to the foundry molding art and provided an additional body of knowledge within which was to be found the answer to the problem purportedly first solved by Bean.

The question, however, of whether the abrasive art is pertinent or analogous to the foundry art and thus, properly used to invalidate the Bean patents for obviousness and anticipation was the subject of dispute in the District Court. Yet, Mr. Gary, a patent lawyer and president of Respondent Schmitt, admitted in his testimony and in contemporaneous documents that the Martin et al. U.S. patent No. 2,010,873 (A62), relied on by Petitioner below, was "very pertinent" and had "an important bearing on the validity on the claims of the Bean patents" (1776a; 1535a-1536a; 494a-497a; 177a). Similarly, although U.S. patent No. 2,706,163, one of the Schmitt patents in suit below, relates to the coating of sand grains for use in foundry molds, the patentee, Fitko, acknowledged that the process would also contemplate the "coating of abrasive granules with resin" (195sa, ll. 1-5).

The Patent Office recognizes that the abrasive art is analogous to the foundry art: most of the art cited against the Schmitt (Fitko) '163 patent related to the foundry art (1102a-1103a); and it cited abrasive art references against the Bean '823 patent (1834a; 1302a-1303a; 1520a), against the Schmitt (Fitko) U.S. patent No. 2,706,188, in suit below (1386a; 1302a-1303a; 1520a), and against the Less '067 patent on which Petitioner has relied as an anticipation of the Bean '267 patent (296sa; 1586a). Yet, of the abrasive art patent references relied upon by Petitioner which the District Court found "most relevant" (A14, par. 18), these were distinguished by the Court *not on the basis of what they disclosed,* but on whether the processes they described were commercially adopted (A18, par. e; A16, par. b), made "commercially acceptable" castings (A19, par. 18; A20, par. 21) or were "impractical for commercial use" (A18, par. e), whether they were expensive (A16, par. c) or involved a longer period of time than present day molding processes (A17, par. c), and whether the processes differed in respect of minor variations in percentages of binder (resin content) (A15, par. b), all of which was irrelevant to a determination of whether the *products* described in these prior patents are identical to or make obvious the *product* later claimed by Bean.

Contemporaneous Invention

Workers in the foundry art, faced with the problem of resin segregation, naturally looked to the teachings of their art and to the related abrasive art for the answer and almost immediately and simultaneously arrived at the same solution. In 1950 the workers at a Ford foundry recognized the answer and suggested coating the sand grains with the resin (1860a, pars. 4-5). At the National Engineering Company, the problem was similarly recognized in 1950 and, in January 1951, it was suggested there that the sand

grains be coated by dissolving the resin in a solvent and mixing with the sand to overcome uneven distribution (915a-916a; 944a-945a). At Monsanto, a resin manufacturer, the identical problem was recognized in 1950 and the resin coating of the sand by a solvent method was suggested by a worker, stating:

> ". . . I knew we could extend the dry resin . . . by dissolving it and coating the sands and distributing it more uniformly throughout the sand mixture." (931a)

Fitko, a co-inventor of the Schmitt '188 patent, testified that he "immediately" recognized in 1950 that resin-coated sand was the answer to the resin segregation problem as soon as he saw the shell molding process carried out at Ford (890a-891a).

It is, therefore, against the teachings of the foundry and abrasive arts that the Bean patents, as allegedly patentable inventions, must be measured. And the ability of workers skilled in the foundry art to glean from these teachings the solution to the resin segregation problem must be taken as evidence that the answers were to be found there. Petitioner believes that neither the District Court nor the Court of Appeals has made the inquiries essential to a determination of patentability as provided by the mandate of this Court in *Graham* v. *Deere*. A comparative study of the Bean patents against this prior art will demonstrate the invalidity of these patents and the error of the courts below in sustaining them.

Argument

Petitioner has consistently contended throughout this litigation that the Bean patents are invalid for each of the following reasons:

(1) Anticipated or obvious in view of the *Foundry Trade Journal* publication (A66);

(2) Anticipated or obvious in view of the *Less et al. patent 2,662,067* (A64);

(3) Obvious in view of the *independent, contemporaneous work of others* *; and

(4) Anticipated or obvious in view of *each of four separate abrasive art patents.***

Petitioner has based its contentions on evidence which is largely documentary and which plainly shows on its face the coating of molding sand with a thermosetting resin to prevent dusting and segregation for use in pre-Croning processes; the thermosetting resin coating of sand for the same purpose and specifically for use in the dry Croning process; the traditional technique in the molding field of coating sand with other binders; the thermosetting resin coating of abrasive granules (alundum, specifically covered in the patent) to individually coat each grain to pre-

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* Monsanto Company (944a-949a; 921a-922a; 251sa; 231sa); National Engineering Company (914a-916a; 1804a; 44sa-45sa; 227sa; 944a-945a), Ford Motor Company (1861a-1862a, par. 8; 1862a, pars. 11, 12; 1859a); Acme Resin Company (877a-880a; 890a-891a; 403a-404a), Less and co-workers (A64), Foundry Trade Journal workers (A66), and Bean, herself (A58). The issue of independent contemporaneous work is discussed in Petitioner's Main Brief in the Court of Appeals, pp. 25-40 and Reply Brief, pp. 18-28.

** Martin et al. U.S. patent No. 2,010,873 (1564a-1569a); Martin et al. U.S. patent No. 2,114,229 (1572a-1575a); Novotny U.S. patent No. 1,901,325 (1545a-1551a); and Novotny U.S. Application No. 382,583, filed July 31, 1929 (1552a-1563a). The abrasive art issue is discussed at length in the Petitioner's Main Brief in the Court of Appeals, pp. 40-59 and Reply Brief, pp. 28-51.

vent segregation and to facilitate the bonding of the granules together to form a rigid, yet porous, article; and finally, it shows, very plainly, the conception and reduction to practice, by a variety of techniques, the resin coating of sand for use in the Croning shell molding process by diverse workers in the field, *i.e.*, chemists, machine manufacturers and molders, all prior to any disclosure of the Bean patent *which lay dormant in the Patent Office for nearly eleven years.* None of this art relied upon by the defendant was cited in the United States Patent Office!

Subject Matter of the Bean '267 Patent

Basic to any consideration of this patent is the fact that its claims are *product claims.* The patented *product* is simply sand grains which are coated with resin. The alleged novelty of this resin coated sand is based upon only three distinguishing characteristics. The resin coated sand grains must be (i) *dry and free flowing;* (ii) each grain must be *individually coated* with resin and (iii) the resin must be a *thermosetting resin.** Plaintiff has not disputed that the patented product is no more than resin-coated sand having these aforesaid characteristics and reference to the representations made by the patentee to the Patent Office in response to citations of prior art during the prosecution of the patent plainly demonstrates this. In fact, it was only by so defining the product that claims were allowed.

For example, during the prosecution of the application for the '267 patent, the patentee represented that (1666a-1667a):

> "The coating of sand grains with *individual coating* of a solid, *non-tacky* [dry] potentially *thermoset-setting* resin is the evident subject of this application * * *".

* No claims to a unique or novel product exist with respect to the making of such a product.

Bean pointed out to the Patent Office, in distinguishing over the prior art, that no single prior art reference disclosed *all three* of these features.

When the Patent Office first cited the prior art Weston U.S. patent No. 2,517,815, Bean argued that although the reference disclosed resin coated sand granules which are (i) dry and free flowing and which are (ii) individually coated with a resin, (iii) *the reference did not disclose that the resin was a thermosetting resin* (1679a):

> "* * * Weston may be read to suggest the coating of sand particles with a resin. Specifically, however, Weston's resin is taught as being 'non-thermosetting' * * *. By contrast, the preferred embodiment of applicant's binder is intentionally of a thermosetting type * * *."
>
> "Accordingly, Weston does not teach a dry or free flowing mass of discrete sand grains each of which is coated with a dry and non-tacky coating of *thermosetting* resin. Weston's sand is coated with a 'non-thermosetting' resin * * *". (1697a)

When the Patent Office cited Valyi U.S. patent No. 2,521,614, Bean argued that although the reference discloses resin-coated sand granules which were (i) individually coated with a (ii) thermosetting resin, (iii) *the reference did not disclose that the resin coated granules were dry and free flowing* (1698a-1699a):

> "Similarly, Valyi fails as a reference, again because there is no teaching therein of sand particles *individually coated with a dry film of thermosetting resin.* * * * There is no teaching in Valyi of a molding composition formed of a dry mass of molding sand the particles of which are individually coated with a dry film of thermosetting resin."

When the Patent Office cited Alysworth U.S. patent No. 1,090,439, Bean argued that although the reference disclosed resin coated sand granules which were (i) dry and free flowing and which are (ii) coated with a thermosetting resin, (iii) *the reference did not disclose that the sand granules were individually coated* (1698a):

> "* * * there is no teaching in Aylsworth of individual sand granules (or even silica particles or woodflour particles) *individually coated* with an enveloping film or dry thermosetting resin. * * *"

The patentee then stated (1699a):

> "* * * at no time in the Weston teaching is there formed or suggested a dry sand with the *individual particles thereof enveloped in* a *dry and non-tacky* coating containing *thermosetting* resin * * *.

On the basis of these representations regarding the essential features cited in the claims, the Patent Office allowed the present claims on the understanding that the issued claims were (1701a-1702a):

> "* * * limited to powdered molding material consisting of separate and individual particles each of which is coated or enveloped in its own *individual film* of *dried* non-tacky *thermosetting* resin * * *."

At trial, the inventor again defined the subject matter of the alleged invention in the same manner it had been defined in the Patent Office (865a):

> "Q. * * * am I right when I say that your invention here is a *dry* granular material that is coated with a thermosetting resin, *individually coated* with a *thermosetting* resin, period? A. No, not period.
>
> "Q. All right, what is it? A. It is a dry, free-flowing granular material that is non-tacky."

The specification of the Bean '267 patent states (A58, col. 2, ll. 30-8):

> "According to the present invention, I coat the grains of sand (by which I mean granular refractory material, *e.g.*, silica, alundum or zircon, etc.), with a *resin coating enveloping the grains individually.* This coat is solid and dry (*i.e.*, non-sticky) at ordinary temperatures * * * the resin is capable of being converted to an infusible bond [a thermosetting resin] * * *."

Claim 2 of the Bean '267 patent is representative of the claims of the patent in suit. Stripped of excess

verbiage, the claimed "invention" is resin-coated sand granules which are (i) dry and free flowing, (ii) each granule being individually coated with a (iii) thermosetting resin.

On the basis of the file history of the patent, the admission of the inventor and the claim language itself, if the prior art teaches or discloses resin-coated sand having these *three* distinguishing features the Bean '267 patent is invalid under the standard of invention laid down by this Court in *Graham* v. *Deere* and subsequently applied by the Fifth Circuit Court itself in *Zero Manufacturing Company* v. *Mississippi Milk Producers Ass'n.*, 388 F. 2d 853 (5th Cir., 1966); *Sisko* v. *Southern Research & Fiberglass Corporation*, 373 F. 2d 866 (5th Cir., 1967); and *National Filters, Inc.* v. *Research Products Corporation*, 384 F. 2d 516 (5th Cir., 1967).

The Foundry Trade Journal Article Directly Anticipates the Bean '267 Patent Under 35 U.S.C. § 102(b)

The *Foundry Trade Journal* disclosed to the public in 1949, more than one year before the filing of the Bean '267 patent application, a (i) *dry silica sand* in which the (ii) *individual grains were coated* with a (iii) *thermosetting resin.* This prior art reference, therefore, discloses a *product* which is identical to the *product* of the Bean patent. In the comparison between the product of this journal reference and the product of the Bean patent which follows, the Court's attention is directed to the following important facts: the '267 patent actually teaches that a *natural wood resin* can be used in place of a *phenolformaldehyde* resin (A58, col. 6, l. 72 to col. 7, l. 3) and that alcohol *methylated spirits* can be used in place of acetone (860a; A58, col. 3, ll. 46-50):

District Court Finding	Foundry Trade Journal
(A10, par. 10)	(A66, p. 485)
"In September, 1950, Mrs. Xarifa L. Bean, Director of Research of plaintiff Morris Bean & Co., discovered that the phenol formaldehyde resin could be coated onto sand grains by dissolving the resin in a solvent such as acetone, adding the resin solution to the sand and mulling the mixture until the solvent fully evaporated. The resulting coated grains were dry, free-flowing and dustless."	"In November 1947 experiments were started on resin coated moulding sands in the grey-iron foundry * * * the principle being to coat clean silica sand with resin * * *. A solution of wood resin in methylated spirits was used * * *. The solution was added to the dry sand in an ordinary mixer. After thoroughly mixing, the sand was passed through a rotary dryer operating at approximately 200 deg. C. to evaporate the solvent and to set the resin round the sand grains. [The resulting coated grains were] similar to dry silica * * *".

The *Foundry Trade Journal* was published on October 20, 1949. When no application for a patent was filed within one year from that date (*i.e.*, by October 20, 1950), then the product, dry, free flowing resin-coated sand, became irretrievably within the public domain. 35 U.S.C. § 102(b). The Bean application was not filed until December 4, 1950.

The Less et al. U. S. Patent No. 2,662,067 Directly Anticipates the Bean '267 Patent Under 35 U.S.C. § 102(e)

In 1949, more than a year prior to the filing of the Bean patent application in December, 1950, Less and his coworkers (1586a) were experimenting with the Croning shell molding process. Like others in the field, however, they observed that the resin in the dry molding composition of sand and powdered resin (as originally proposed by Croning) would become separated from the sand and un-

evenly distributed in the mixture. Less and his co-workers discovered that it was desirable to preliminarily coat the resin onto the sand before using it in Croning's shell molding process. Less coated the resin onto the sand for precisely the *same reason* that Bean coated her sand, that is, to avoid resin segregation, eliminate dust, distribute the resin more evenly, etc. Less produced a dry, free flowing resin-coated sand in which the individual sand granules were coated with a thermosetting resin.

Both Bean and Less were working with a dry mixture of sand and powdered resin (Bean in connection with her disposable plaster pattern process and Less in connection with the Croning shell molding process). They both recognized that in order to avoid resin segregation, dust, health dangers, the use of complicated mixing equipment, etc., the resin should be coated on the sand.*

Basically the only contention raised by Respondents in the District Court with respect to this reference is that Less et al. used one method for making the resin-coated sand (wetting agent method), whereas Bean used another method (the solvent coating method). But Respondents never disputed the fact that Less et al. teaches and discloses a dry, free flowing resin-coated sand in which the individual sand grains were coated with a thermosetting resin. Nor did they ever dispute the fact that Less et al. taught the use of resin-coated sand to make a foundry mold.

There can be no patentable distinction between Less's wetting agent method and Bean's solvent coating method, both of which accomplish the same result. The claims are product claims and it makes no difference *how* the product was made.

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* The problems which the District Court found to be allegedly solved by Bean's use of resin coated sand were the same problems which Less overcame when he used resin-coated sand. The inventive thought is identical (A64, col. 1, l. 1 to col. 2, l. 8; col. 2, ll. 25-34).

Most apposite to the aforesaid are the facts that first, *the patentee, in the Bean '267 patent* admitted that the wetting agent method was an equivalent, alternative method which could be used in place of the solvent coating method to accomplish the same result and, secondly, during the prosecution of the application for the Bean '267 patent, the Patent Office rejected all of the solvent coating process claims on the ground that solvent coating was an obvious technique well known in the foundry art. Bean acquiesced in this rejection and abandoned all process claims covering the solvent coating method (1686a, 1688a, 1628a, 1652a-1655a).

Thus, the only claims remaining in the patent, then, were product claims. In other words, the allegedly patentable invention to which the remaining claims were directed, was the concept of a dry, free-flowing resin-coated sand, *not the method of making it.* Since the concept of dry, free flowing thermosetting resin-coated sand was already taught by Less et al., what was Bean's patenable discovery?

A comparison between the Bean '267 patent and the Less et al. '067 patent plainly demonstrates the pertinency of this prior art reference:

The Bean '267 Patent (A58)	The Less '067 Patent (A64)
"Another method is to moisten the sand and then dust with the powdered binder, which adheres in a thin coat to the moisture film on each grain" (col. 3, ll. 21-4 . . ."	Sand grains are first moistened and a wetting agent (adhesion agent), then a powdered phenolformaldehyde (thermosetting) resin is mixed in, such that the powdered resin adheres tightly in a thin coat around the sand grains (col. 1, l. 54 to col. 2, l. 8); (col. 3, ll. 30-42).
The resin coated sand is "dry, free flowing . . ." (col. 3, l. 8).	The resin coated sand is "entirely free flowing . . ." (col. 2, l. 30).

Based on the disclosure made in the Less et al. '067 patent as well as that in the *Foundry Trade Journal,* it is truly difficult to comprehend the District Court's statement that "None of the prior patents relied upon by Petitioner discloses *or suggests* any of the inventions claimed in the Bean '267 . . . patents" when these two references alone, are considered!

The Bean '267 Patent Is Invalid Over the Teachings of the Abrasive Art

We have stated hereinabove the reasons which we believe make it plain that the abrasive art is analogous to the foundry art and properly considered in any determination of the validity of the Bean patents. Based on the pertinency of this art, a skilled foundryman would doubtless look to the teaching of the abrasive art for guidance in solving the problem of resin segregation in a foundry process. Indeed, Respondents relied below * on the phrase (recited in the claims) "for forming into foundry casting molds *and the like*" to distinguish the resin-coated alundum claimed in the Bean '267 patent from the resin-coated alundum described in the abrasive art.

The abrasive art shows in just one abrasive art patent, Martin 2,010,873, issued September, *1937,* the same *inventive concept* of resin coated refractory grains, *uniformly coated,* which are *non-tacky* and adapted *to bond together* to form an article!

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* Respondents' (Plaintiffs-Appellees) Main Brief in the Court of Appeals, p. 24.

Bean '267 (A58)	Martin '873 (A62)
The resin coating is "dry (i.e. non-sticky) at ordinary temperatures (col. 2, l. 35).	The resin coating is "not sticky or tacky at ordinary temperatures" (col. 2, l. 26).
The resin coating is a "continuous coating of each grain of sand" (col. 3, ll. 7-8).	The resin coating "completely surrounds each grain" (col. 1, l. 42).
"sand (by which I mean granular refractory material, e.g. silica, alundum fused alumina)" are used (col. 2, ll. 32-3).	"fused alumina abrasive grains" are used (col. 1, ll. 74-5).
"thermosetting resins" are used (col. 2, l. 63).	"heat hardenable synthetic resin" is used (col. 1, ll. 18-19). [redacted]
"In general, the binder percentage will range between ½% and 5% (col. 7, ll. 68-9).	"It will be appreciated that a great many variations in • • • bond content can be made" (col. 1, ll. 19-21).
"It is important that the distribution of the resin in the mass is uniform and thorough." (col. 3, ll. 60-2).	"the distribution of the bond is under positive control and the bond is not haphazardly spread both around and between the grains" (col. 2, ll. 50-2).

The District Court, rather than measuring this plainly pertinent teaching against the alleged advance, simply found that this "• • • process was used commercially to a limited extent • • •" and "• • • was discontinued because of its expensiveness" (A16, par. c). These findings with respect to commercial use of prior art references are clearly inconsistent with the Fifth Circuit Court's own prior holding in *National Filters, supra*, p. 518, which holds:

> "Whether prior art patents have been put to use is irrelevant to the question whether the disclosure therein constitutes anticipation • • •".

Conclusion

We most respectfully suggest that a thoughtful consideration of the evidence presented by Petitioner in the courts below compels the conclusion that the Bean patents embody no inventive concept when measured against the prior art as required by this Court in *Graham* v. *Deere, supra.* The measure in that case being (*supra,* pp. 6, 17):

> "• • • Congress may not authorize the issuance of patents whose effects are to remove existent knowledge from the public domain, or to restrict free access to materials already available • • •".
>
> • • •
>
> "• • • the ultimate question of patent validity is one of law • • •, the §103 condition [invention] • • • lends itself to several basic factual inquiries. Under §103 the scope and content of the prior art are to be determined; differences between the prior art and the claims at issue are to be ascertained; and the level of ordinary skill in the pertinent art resolved. Against this background, the obviousness or non-obviousness of the subject matter is determined."

Moreover, apart from plain error by the lower courts in sustaining the validity of these patents in the face of overwhelming evidence to the contrary, the failure of these courts to rule or otherwise comment on the most pertinent evidence bearing on the issue of validity has deprived Petitioner of a full and fair trial or judicial disposition of the issues in this case.

For the reasons stated herein a Writ of Certiorari should issue to review the judgment of the Court of Appeals for the Fifth Circuit.

Dated: May 7, 1970

Respectfully submitted,

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Certificate of Service

I certify that a copy of the foregoing Petition for Writ of Certiorari to the United States Court of Appeals for the Fifth Circuit was mailed to Leigh M. Clark, Esq., Cabaniss, Johnston, Gardner & Clark, Birmingham, Alabama, and a copy was delivered to William C. Conner, Esq., Curtis, Morris and Safford, New York, New York, attorneys and counsel for Respondents this 8th day of May, 1970.

THOMAS F. REDDY, JR.
Attorney for Petitioner

IN THE

Supreme Court of the United States

October Term, 1969

No. 1559

STOCKHAM VALVES AND FITTINGS, INC.,

Petitioner,

versus

ARTHUR J. SCHMITT FOUNDATION and MORRIS BEAN & COMPANY,

Respondents.

APPENDIX TO PETITION FOR WRIT OF CERTIORARI TO THE UNITED STATES COURT OF APPEALS FOR THE FIFTH CIRCUIT

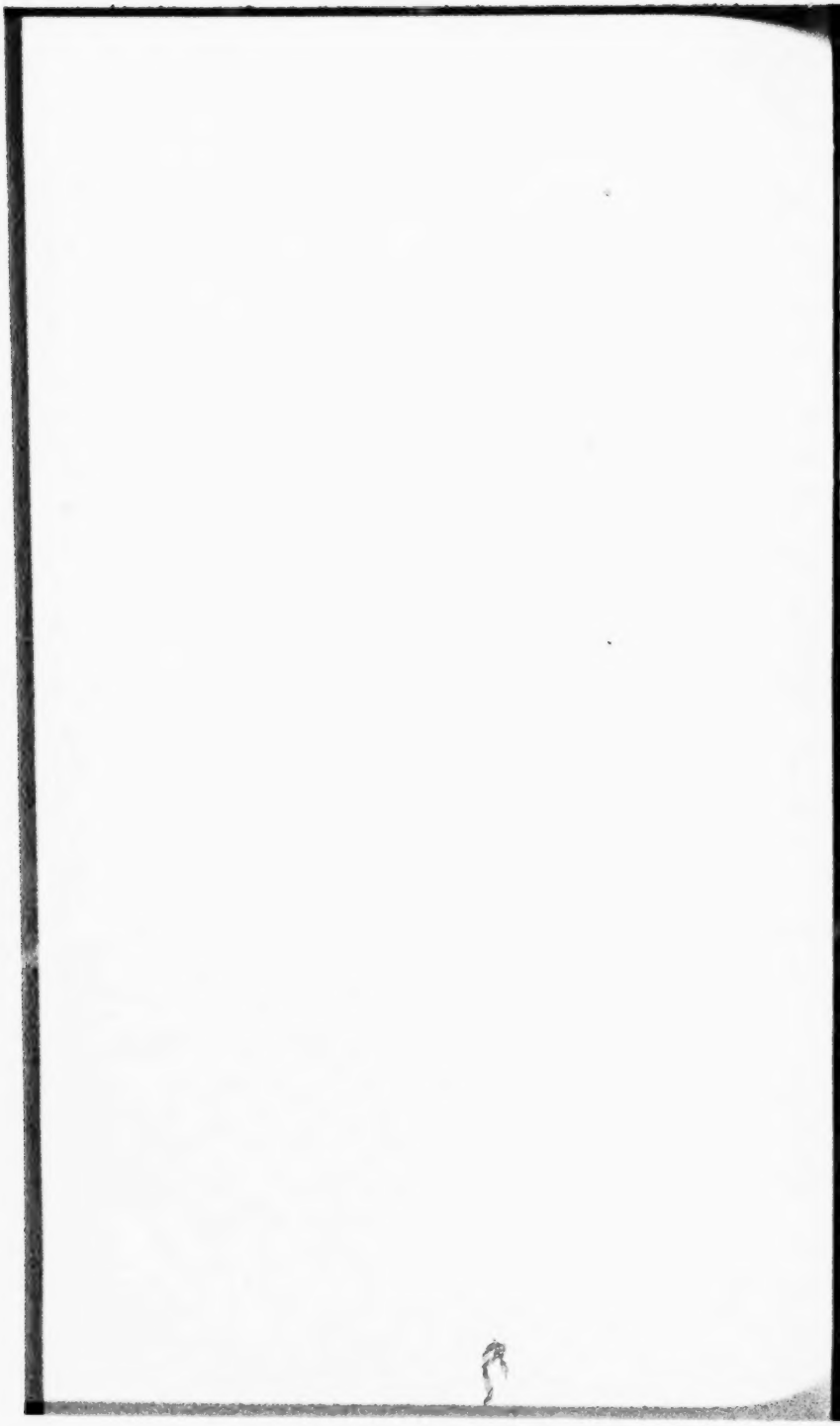
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IN THE

United States Court of Appeals

For the Fifth Circuit

No. 24614

STOCKHAM VALVES AND FITTINGS, INC.,
Appellant,

versus

ARTHUR J. SCHMITT FOUNDATION and
MORRIS BEAN & COMPANY,
Appellees.

ARTHUR J. SCHMITT FOUNDATION,
Appellant,

versus

STOCKHAM VALVES AND FITTINGS, INC.,
Appellee.

APPEALS FROM THE UNITED STATES DISTRICT COURT
FOR THE NORTHERN DISTRICT OF ALABAMA

(November 22, 1968)

Before: COLEMAN and MORGAN, *Circuit Judges*, and HUNTER, *District Judge*.

Opinion of Court of Appeals

PER CURIAM: This is an appeal from a judgment entered by the District Court on December 9, 1963. The action alleged infringement of the following four patents

relating to resin-coated sand as used in the making of molds for metal casting:

Patent No.	*Filing Date*	*Issue Date*	*Patentee*
2,991,267	Apr. 10, 1957	July 4, 1961	X. L. Bean
2,914,823	Dec. 4, 1950	Dec. 1, 1959	X. L. Bean
2,706,188	July 5, 1952	Apr. 12, 1955	C. W. Fitko & J. S. Horn
2,706,163	June 5, 1953	Apr. 12, 1955	C. W. Fitko

The first two listed patents are owned by plaintiff-appellee Morris Bean & Co., a foundry in Yellow Springs, Ohio; and the latter two are owned by plaintiff-appellee Arthur J. Schmitt Foundation, a non-profit Illinois corporation. The defendant-appellant Stockham Valves & Fittings, Inc. is a foundry in Birmingham, Alabama, which makes resin-coated sand and uses it for casting valves and pipe fittings.

The District Court declared all of the claims of the two Bean patents in suit valid and infringed, the single Claim 8 of the Schmitt Foundation patent No. 2,706,188 in suit valid but not infringed, and the four claims of the Schmitt Foundation patent No. 2,706,163 in suit invalid but infringed if valid. The defense of unenforceability due to alleged patent misuse was overruled as to all four patents. Defendant appeals from the rulings of validity and infringement of the two Bean patents, the ruling of validity of the '188 patent, the ruling of infringement of the '163 patent, and the ruling that the patents in suit have not been misused. Plaintiff Schmitt Foundation cross-appeals from the rulings of non-infringement as to the '188 patent and of invalidity as to the '163 patent.

We are convinced that the rulings of the District Court are based on the application of sound legal principles to facts firmly established in the record. We are in complete accord with that Court's findings and conclusions which are reported at — F. Supp. —, and have nothing further to add to them. The Judgment is AFFIRMED.

Judgment of Court of Appeals

IN THE

UNITED STATES COURT OF APPEALS

FOR THE FIFTH CIRCUIT

October Term, 1968

No. 24614

D. C. Docket No. CA 63-383

STOCKHAM VALVES AND FITTINGS, INC.,
Appellant,

versus

ARTHUR J. SCHMITT FOUNDATION and
MORRIS BEAN & COMPANY,
Appellees.

ARTHUR J. SCHMITT FOUNDATION,
Appellant,

versus

STOCKHAM VALVES AND FITTINGS, INC.,
Appellee.

APPEALS FROM THE UNITED STATES DISTRICT COURT
FOR THE NORTHERN DISTRICT OF ALABAMA

Before: COLEMAN and MORGAN, *Circuit Judges*, and
HUNTER, *District Judge*.

This cause came on to be heard on the transcript of the record from the United States District Court for the Northern District of Alabama, and was argued by counsel;

Judgment of Court of Appeals

On Consideration Whereof, it is now here ordered and adjudged by this Court that the judgment of the said District Court in this cause be, and the same is hereby, affirmed;

It is further ordered and adjudged that each party shall pay its own costs incurred in this appeal.

November 22, 1968

Issued as Mandate:

Order on Petition for Rehearing

IN THE

UNITED STATES COURT OF APPEALS

FOR THE FIFTH CIRCUIT

No. 24614

STOCKHAM VALVES AND FITTINGS, INC.,
Appellant,

versus

ARTHUR H. SCHMITT FOUNDATION and
MORRIS BEAN & COMPANY,
Appellees.

ARTHUR J. SCHMITT FOUNDATION,
Appellant,

versus

STOCKHAM VALVES AND FITTINGS, INC.,
Appellee.

APPEALS FROM THE UNITED STATES DISTRICT COURT FOR THE NORTHERN DISTRICT OF ALABAMA.

ON PETITION FOR REHEARING AND PETITION FOR REHEARING EN BANC

(February 9, 1970)

Before COLEMAN and MORGAN, *Circuit Judges*, and HUNTER, *District Judge*.

PER CURIAM: The Petition for Rehearing is DENIED and no member of this panel nor Judge in regular active

service on the Court having requested that the Court be polled on rehearing en banc, (Rule 35 Federal Rules of Appellate Procedure; Local Fifth Circuit Rule 12) the Petition for Rehearing En Banc is DENIED.

Opinion of H. H. Grooms, United States District Judge

IN THE

UNITED STATES DISTRICT COURT

FOR THE NORTHERN DISTRICT OF ALABAMA
SOUTHERN DIVISION

No. 63-383

ARTHUR J. SCHMITT FOUNDATION and
MORRIS BEAN & COMPANY,

Plaintiffs,

v.

STOCKHAM VALVES AND FITTINGS, INC.,

Defendant.

FINDINGS OF FACT AND CONCLUSIONS OF LAW
Filed Oct. 28, 1966

This action was submitted for decision after thirty-one days of testimony. Upon such testimony, the exhibits, oral arguments and briefs; and the Court being fully advised, enters the following Findings of Fact and Conclusions of Law pursuant to Rule 52.

Opinion of H. H. Grooms

FINDINGS OF FACT

1. This is an action brought under the patent laws of the United States, U. S. Code, Title 35 and Title 28, Section 1400(b), and charges infringement of four patents relating to resin-coated sand as used in the making of foundry molds for casting iron and other metals. The patents in suit are:

Patent No.—Filing Date—Issue Date—Patentee—Subject.

2,991,267—Apr. 10, 1957—July 4, 1961—X. L. Bean—Resin Coated Sand.

2,914,823—Dec. 4, 1950—Dec. 1, 1959—X. L. Bean—Casting Mold.

2,706,188—July 5, 1952—Apr. 12, 1955—C. W. Fitko & J. S. Horn—Partially Reacted Resin Coated Sand.

2,706,163—June 5, 1953—Apr. 12, 1955—C. W. Fitko—Resin Coated Sand with Waxy Coating.

2. The December 4, 1950, application was a composite one covering a method of making foundry molds employing a disintegrable plaster pattern and a resin coated sand invention. The Patent Office required a division of the application, and a divisional application was filed August 16, 1956. A further division was required and on April 10, 1957, a continuation-in-part application was filed. Patent No. 2,836,867, not here in suit, covering a disintegrable plaster pattern was issued on the original application; No. 2,914,823 was issued on the divisional application, and No. 2,991,267 on the continuation-in-part application.

3. Plaintiff Morris Bean & Co. is an Ohio corporation engaged in the foundry business and having its principal office at Yellow Springs, Ohio. It is the owner of the Xarifa L. Bean patents Nos. 2,991,267 and 2,914,823 in suit.

4. Plaintiff Arthur J. Schmitt Foundation (hereinafter "Schmitt Foundation") is a non-profit Illinois corporation having its principal office in Chicago, Illinois. It is the owner of the Fitko et al. patent No. 2,706,188 and the Fitko patent No. 2,706,163 in suit.

5. Defendant Stockham Valves and Fittings, Inc. (hereinafter "Stockham") is a Delaware corporation engaged in the foundry business and having its principal office at Birmingham in the Northern District of Alabama, Southern Division.

6. Reichhold Chemicals, Inc., a Delaware corporation having its principal office at White Plains, New York, which supplies part of the specially formulated phenol formaldehyde resin used by Stockham in making its resin coated sand, has by and at its expense conducted the defense of this action, and has agreed to indemnify Stockham against patent infringement in such use of its resin.

7. Prior to World War II, the basic method of making molds for foundry castings involved the use of "green sand" containing sufficient clay and moisture to give it "green strength" or tackiness and cause it to retain the shape of a pattern against which it was pressed.

This green sand process involved considerable skilled labor and was therefore relatively expensive. The molds, with their enclosing flasks, were also heavy and unwieldy. The molds could not be stored for any substantial period of time, and had to be formed as they were needed.

8. Following the War, United States experts uncovered in occupied Germany a significant discovery known as the Croning or "C" process of making "shell" molds. This process involved mixing sand with about 6 to 8% by weight

of dry, powdered phenol formaldehyde resin to form a free-flowing granular mixture which could be dumped onto a heated metal pattern and, without any pressure except that of gravity, would flow into conformity with the pattern contour. The heat of the pattern caused the resin first to melt and flow and ultimately to harden and thermoset to bind the sand grains together to form a rigid shell some ¼ inch or ⅜ inch thick adjacent the pattern. Inverting the pattern would allow the excess, unbonded mixture to fall back into the supply box for subsequent use.

Two of these shells were placed together to form a complete casting cavity. The shells were usually backed up with loose sand, steel shot or the like to support them against the pressure of the molten metal. The shells retained their strength long enough for the molten metal to solidify sufficiently to become self-supporting, after which the heat from the casting caused decomposition of the resin binder with resulting disintegration of the shells so that they would readily crumble away to free the casting.

The Croning process supplied a number of advantages over the green sand process, including improved dimensional accuracy and surface finish of the castings, susceptibility to production with unskilled labor or even automatic machinery, and light weight and storability of the shells. The process had a number of disadvantages including the following:

a. Due to the great difference in density of the sand and the powdered resin, handling of the mixture caused the resin to segregate from the sand and become unevenly distributed in the mixture. In areas of low resin concentration, the shells were apt to be weak, while elsewhere the resin might be so concentrated as to fill the spaces between the sand grains and destroy the permeability necessary to permit escape of the gases generated during casting. If these gases could not escape through the mold in the

usual way, they tended to blow back into the molten metal causing "blow holes" in the surface of the casting.

b. The powdered resin "dusted" out of the mix, creating a fire and explosion hazard, as well as causing dermatitis in many persons of allergic susceptibility.

c. Much of the expensive resin was wasted.

d. The powdered resin-sand mix could not be handled or transported by many types of automatic machinery or conveyors, and could not be blown by air pressure into the heated core cavities of automatic core-making machinery, without causing separation of the resin from the sand. Thus, even after the Croning process went into commercial use for making shells, cores still had to be made by the old baked core process.

9. The Ford Motor Co., which started using the Croning process commercially about 1950 for the casting of valves and other automotive parts, recognized the aforementioned difficulties with the process and experimented for a number of years in attempts to overcome these difficulties. Much of Ford's experimental work was in its attempt to prevent the segregation and dusting of the powdered resin by first wetting the sand grains with minor percentages of various wetting agents and adding the powdered resin in an attempt to cause it to adhere to the moistened grains. These efforts met with no success. Other companies using the process were experiencing similar difficulties with segregation and dusting, and had conducted unsuccessful experiments in an attempt to alleviate these difficulties.

10. In September, 1950, Mrs. Xarifa L. Bean, Director of Research of plaintiff Morris Bean & Co., discovered that the phenol formaldehyde resin could be coated onto sand

grains by dissolving the resin in a solvent, such as acetone, adding the resin solution to the sand and mulling the mixture until the solvent fully evaporated. The resulting coated grains were dry, free-flowing and dustless. Although Mrs. Bean reduced the amount of resin to about 4% by weight of the sand and produced coatings of only about one ten-thousandth of an inch around each grain, the resin coated sand upon heating was capable of forming strong foundry molds wherein the sand grains were bonded together at the points of contact of the grains, leaving substantial open interstices between the grains for the escape of gases through the mold. Such resin coated sand has been used commercially by Morris Bean & Co. from about October, 1950 to the present. It has sold almost twelve million dollars worth of castings made with resin coated sand, most of which castings could not have been made at all without such coated sand.

11. About February, 1951, Schmitt Foundation owners of Acme Resin Company commenced a program of research in an attempt to develop a resin coated sand. Experiments were conducted throughout the year 1951 and into 1952. Its chemists added the resin in liquid form and employed heat to "advance" or polymerize the resin in their attempt to produce a coating of solid resin on the grains.

Throughout 1951, the Foundation was unable to achieve a commercially satisfactory resin coated sand. In the 1951 experiments a liquid "one-step" resin[1] had been employed. Beginning early in 1952 a novolak or "two-step" resin[2] was employed. Hexamethylenetetramine (hereinafter

[1] Resins containing sufficient formaldehyde for complete reaction with phenol. Such resins are hardened and thermoset merely by the application of heat.

[2] A resin having a molar deficiency of formaldehyde, so that it cannot thermoset until a hardening agent is added.

"hexa") was added as a hardening agent. When heated, the hexa breaks down into formaldehyde and ammonia, the latter acting as a catalyst for the reaction between the formaldehyde and the excess phenol of the resin, so that the polymerization reaction can proceed to completion, causing the resin to harden or thermoset. The resin, sand, and hexa was mulled in a mulling machine. The mulling of the hot mix was stopped when the reaction of the resin and hexa had proceeded to the point where the softening point, or the "stick point," of the resin (as measured on a metal bar heated at one end) was in the range from 80° to 102° C. With the sand thus coated, Fitko and Horn were able to produce good shell molds, and good castings from the molds with the use of much less resin than used in the Croning process. The July 5, 1952, application, upon which patent '188 was issued, followed these experiments.

12. In subsequent experimentation, Fitko found that during the mulling operation, as the resin advanced through a tacky stage, considerable strain was imposed on the muller. In an attempt to reduce this strain by adding to the mix a lubricating material, such as Acrawax, a high melting point synthetic wax, he discovered that the addition of certain proportions of this waxy material greatly increased the strength of the shell molds. He attributed this result to his belief that the waxy material had formed an outer coating around the resin coated sand, increasing the flowability of the grains and according the density of packing of the grains when they were dropped onto the heated pattern. Several other high melting point waxy materials, such as calcium stearate, produced similar results. The June 5, 1953, application, upon which patent '163 was issued, followed these experiments.

13. Resin coated sand had a number of significant advantages over the Croning process. Of particular signifi-

cance was the saving in the cost of resin. The amount of resin required was reduced from a range of about 6% to 8% by weight of the sand to a range of 2½% to 4½%, a saving of as much as one-half in the cost of the resin, which represented a major portion of the total expense involved. At Ford's Dearborn Specialty Foundry alone, this resulted in a saving of approximately half a million dollars annually, based upon the 1953 volume, when the Croning process was used in casting only a few of the many parts required by Ford. At General Motors' Saginaw and Danville foundries alone, the savings in resin costs ran as high as $800,000 per year.

The several problems referred to in Finding 8 were met. "Dusting", and the resulting fire and explosion hazards, were virtually eliminated, and dermatitis was completely avoided. The resin coated sand could be handled in automatic machinery without segregation. Cores could be blown with coated sand, thus making it possible to eliminate not only the Croning process but also the baked oil process used in producing cores, thereby permitting foundries to standardize their processes and to greatly reduce the cost and improve the quality of the cores. Surface finish of the castings was improved, reducing the amount of machining required and the percentage of scrap.

The use of resin coated sand has substantially supplanted the use of the Croning process.

14. Schmitt Foundation initially attempted to license its patents to the foundry industry. However, the foundries resisted taking a direct license, suggesting that it instead concentrate its licensing efforts on the manufacturers.

By 1961, Schmitt had suceeeded in licensing several of the larger resin suppliers either to make and sell resin coated sand or to sell resin with a sub-license to use it for coating sand.

15. When the Bean patent No. 2,991,267 in suit issued, containing claims of basic scope on resin coated sand, the officials of Schmitt investigated and concluded that these claims were valid and dominated the Schmitt patents, so that its licensees would also require a license under the Bean patents.

Schmitt Foundation and Morris Bean & Co. accordingly decided to enter into a joint licensing program, making their patents collectively available to all in the foundry industry for a reasonable royalty.

16. All of the significant U. S. suppliers of the special phenol formaldehyde resin used in resin coated sand, with the exception of Reichhold Chemicals, Inc., have taken licenses under the patents in suit, and nearly one-half million dollars in royalties has been paid under these licenses.

VALIDITY

17. In its lists of prior art, defendant cited a total of 57 items (39 patents and 18 publications), and at the trial introduced in evidence 39 items (24 patents, 13 publications and 2 abandoned patent applications). Most of the prior patents were applied against all four of the patents in suit.

18. None of the prior patents or publications relied upon by defendant discloses or suggests any of the inventions claimed in the Bean '267 and '823, and Fitko '188 patents. The prior patents which are most relevant to the broad inventions of these patents are those in the abrasives art, which disclose the use of phenol formaldehyde resins on abrasive grains for the purpose of forming grinding wheels and other bonded abrasive articles.

The more relevant of these prior patents are:

a. Martin U.S. patent No. 1,266,246 which discloses a method of making abrasive articles and involves wetting abrasive grains with about 3% by weight of furfural, a resin-forming solvent. 7 to 15% by weight of powdered resin is then added with the objective of causing it to adhere to the moistened grains. To form a grinding wheel, the coated grains are pressed in a mold under a pressure of 900 pounds per square inch, then removed from the mold and baked 15 hours at 350° F.

The coated grains are slightly tacky so that they can be pressed together in the desired shape and will hold this shape after removal from the mold for baking. They are not dry and free-flowing within the meaning of the patents in suit, and cannot be stored without caking, but must be used within a few hours after mixing. Any appreciable handling causes the powdered resin to separate from the grains. Tests showed that the process by which sand grains are coated in the manner disclosed by this patent is not capable of making usable shell molds, even though the lower content of 7% of resin taught in the patent is used.

b. Novotny U.S. patent No. 1,901,325 which discloses a method of treating abrasive grains by heating the grains to a temperature of 180° to 200° F., and mixing with the heated grains 5% by weight of powdered resin with the objective of causing the powdered resin to melt and coat the grains. The treated grains are then wet with 0.2% to 5% by weight of a liquid resin, and 12% by weight of a powdered resin is added with the objective of causing the powdered resin to adhere to the moistened grains. The grains are then placed in a mold and cold pressed to the desired form, removed from the mold and baked. This method differs considerably from those disclosed in the patents in suit.

Opinion of H. H. Grooms

The abandoned Novotny U.S. patent application, Serial No. 382,583, discloses a simplified process in which the abrasive grains are pre-heated to 250° to 300° F. and mixed with 14% by weight of solid resin with the objective of causing the resin to melt and coat the grains. The coated grains are intended to be placed in a mold and formed to the desired shape by either applying a compacting pressure of 500 to 2,000 pounds per square inch, or by tamping, jarring or rolling. The formed article is then removed from the mold and baked from 5 to 52 hours at temperatures increasing from 175° to 350° or 390° F.

In actual commercial use, and confirmed by tests in which 5% by weight of powdered resin was used, it was found that this process caused the resin to advance or polymerize and become sticky so that it was not possible to obtain a thin, uniform coating. The resin coating was also brittle, so that handling caused the resin to break off of the grains. Moreover, the resin was so far advanced that it was no longer capable of softening and flowing sufficiently to form a strong bond between the grains, and was "useless for commercial purposes."

c. Martin and Upper U.S. patent No. 2,010,873 which discloses a process that commences with abrasive grains coated with powdered resin by the process disclosed in either the Martin patent No. 1,626,246 or the Robie patent No. 2,076,517 and modifies the coating by spreading out the grains in a single layer on a metal pan or moving metal belt and heating them at a temperature of 350° F. for 2½ minutes, with the objective of causing the powdered resin to fuse into a solid, homogeneous film which is said to be hard, dry and non-tacky. This process was used commercially to a limited extent during the middle 1930's by the patent owner, The Carborundum Company, but was discontinued because of its expensiveness.

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The time required to heat the abrasive grains on a moving belt through a heating oven was such as to render of questioned practicality the use of the process in making grinding wheels. The process would be wholly impractical for use in foundry molding where very large volumes of coated grains are required and where these grains do not form part of the product which is sold but are consumed and discarded and merely represent manufacturing overhead cost. Tests indicated that only poor shells can be made and that the coated grains caked on standing.

d. Robie U.S. patent No. 2,076,517 which discloses a process similar to that of the Martin patent 1,626,246 except that the abrasive grains are wet with about 2% by weight of a liquid resin before about 7% by weight of powdered resin is added.

This process and that of the Martin '246 patent have been for many years and still are the principal commercial methods of making bonded abrasive articles. The coated grains produced by this patent have all of the characteristics of those produced by Martin '246, including tackiness, lack of storage stability and tendency for segregation of the resin from the grains. Tests showed that sand coated by this process with 4%, 9% and 14% resin made poor molds and rough castings.

e. Benner & Melton U.S. patent No. 2,092,903 which discloses a process of coating abrasive grains with various types of bonding materials including glues, varnishes, lacquers and synthetic resins by dissolving the bonding material in a solvent, immersing the grains to be coated in the solution and either spraying the solution and grains out of a nozzle or extruding them through an orifice and using jets of gas to break up the emerging stream. It is intended that the solvent will evaporate during the interval the grains are falling to the floor or other surface below, to leave the grains coated with solid, dry films of the bonding material.

The patent does not disclose any relative proportions of binder, solvent and grain, nor the structure of the spraying or extruding apparatus, etc. Thus it does not contain sufficient teaching to insure a successful coating operation.

Records of The Carborundum Company show that those who experimented with the process encountered various difficulties including the fact that considerable amounts of the resin were sprayed free of the grains rather than being attached to the grains. Tests conducted by plaintiffs in the present litigation, under the conditions described in the Carborundum records, showed that the coating did not have time to dry while falling from even a height of 15 feet, and the grains clumped badly when collected. Carborundum never used the process commercially, and it is apparently impractical for commercial use.

f. Martin & Upper U.S. patent No. 2,114,229 which discloses a method that commences with abrasive grains coated with powdered resin by either the Martin '246 process or the Robie '517 process. These grains are spread out on pans in a layer about 1 inch thick and aged from 10 to 48 hours at temperatures from 60° to 108° F. and at low humidity, with the objective of causing the powdered resin to coalesce into a solid, homogeneous film.

Because of the considerable handling involved and the resulting high cost, the process was of limited commercial practicality for the preparation of abrasive grains employed in the manufacture of grinding wheels. It would be impractical for preparing the much larger volume of resin coated sand consumed and discarded in shell molding operations. Tests by both parties showed that the grains coated in the manner disclosed, though subjected to an added mulling operation following the aging step, still caked on standing.

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Tests by plaintiffs, using sand coated with 4%, 7% and 14% resin, showed that shell molds made by this method were unusable. Defendant was able to produce shells by the unusual procedure of dumping a Croning-type mix of sand and dry, powdered resin over a layer of the resin coated sand on the hot pattern to form a bonded back-up layer before inverting the pattern. The castings produced in these shells were not commercially acceptable.

19. There are a number of substantial differences between the materials, techniques and objectives of the abrasives art and those of the shell molding art, including the following:

a. In making bonded abrasive articles, sharp-edged grains produced by crushing fused aluminum oxide or silicon carbide are preferred and are used almost exclusively. Such grains are also used in making high quality "sandpaper" and other coated abrasives. Sand is not used except in the cheapest grade of sandpaper.

In foundry molds, round grained sands are preferred, and used, except where the higher cost of round grains dictates the use of sub-angular grains (having rounded corners between angularly disposed faces).

b. In resin-bonded grinding wheels, the normal range of resin content is 8% to 14% by weight of the grains. Over 99% of bonded abrasives have resin contents in the range of 6% to 17%. In resin-coated foundry sands, the typical range of resin content is 3% to 4½% by weight of the sand. While certain types of bonded articles made with abrasive grains, such as rubbing blocks and filter plates, use binder percentages as low as 4% or 5%, such articles are not ordinarily made with resin binder, but with vitrified clay binder.

c. In making grinding wheels, the grains and bonding material are always compacted under pressure, usually very high pressure, in a mold. This requires grains which are "pressure sensitive" or slightly tacky. Then the formed article is removed from the mold and baked for a number of hours. In shell molding, the coated grains are either dropped against a heated pattern or blown into a heated core box, are subjected to only very light pressure, such as the force of gravity, and the only heat supplied is that which is transmitted from the pattern or core through the mass of grains during a minute or less before the pattern or core is inverted.

d. The end uses of an abrasive article and a foundry mold are entirely different. A foundry mold must withstand the pressure of the hot, molten metal for a sufficient period to permit the metal to solidify, then the resin binder must disintegrate to permit separation of the mold from the casting; no such requirements exist in the use of abrasive articles.

20. Because of these and other differences between the abrasives art and the foundry art, the existence of the patents and publications in the abrasives art cited by defendant did not render Bean '267 and '823 and Fitko '188 inventions obvious to persons of ordinary skill in the art.

21. The tests performed by both parties in the present litigation showed that if anyone had attempted to employ the methods disclosed in the abrasives art to produce resin-coated grains for foundry molds, even with changes in the types and sizes of grains and the percentages of resin used, he would not have been able to produce shell molds which could have been used to make commercially acceptable castings.

22. In addition to the aforementioned patents defendant also relied upon an abandoned patent application Serial No. 215,906 of Henby and McIlvaine of National Engineering Company. That application disclosed dissolving a phenol formaldehyde resin in methanol and mixing it at room temperature with sand, in a ratio of 4½% of resin solids by weight of sand, until the methanol evaporates. The application asserted that a dry, free-flowing resin coated sand is produced. In actual use it was found that the methanol evaporates so slowly and incompletely at room temperature that the resin coating usually does not become fully dry and non-tacky.

This patent application was not filed until March 16, 1951, three months after the filing on December 4, 1950 of Mrs. Bean's parent application for patent No. 2,991,267 in suit. The first experimental work of Henby and McIlvaine was not done until January 4, 1951. Since pending patent applications are held in secrecy by the Patent Office, this application was never publicly available.

23. Defendant also relied upon the experimental work of J. E. McMillan of Monsanto Company as being prior to Bean '267. McMillan's only notebook records of actual experimental work show that he was attempting to increase the green strength of binders for grinding wheels. The only batch which he claimed to have mixed to "dryness" was the one which subsequent tests showed to have the highest green strength or tackiness. Such a material was not dry, hard and free-flowing within the meaning of the patents in suit. There was no attempt to use this material to make shell molds or any other bonded articles.

24. None of the prior patents or publications cited by defendant teaches the partial reaction of a novolak resin with hexamethylenetetramine during the process of coating a granular material, to yield a coated material having

a stick point in the range of 80° C. to 102° C., as claimed in the Fitko et al. patent No. 2,706,188 in suit.

This range of stick points is significant in shell molding. If the stick point is substantially below 80° C., the coated sand cakes on standing in hot, humid weather; if the stick point is substantially higher than 102° C., the resin will be so far advanced that it will not soften and flow sufficiently to cause the coatings of adjacent granules to bond together, and thus will not form a shell of acceptable strength.[2a]

Validity of the Fitko '163 Patent

25. At the time of the filing of the application for the Fitko '163 patent, June 5, 1953, resin coated sand was known and used as a molding composition. Prior thereto, the public literature had disclosed and described the addition of wax, e.g., metallic soaps such as calcium stearate, and other lubricants to molding compositions to act as a mold release agent; as a plasticizing agent; and as a lubricant. Wax was, in fact, a well-known mold release agent, a well-known plasticizing agent, and also a well-known lubricant in plastic molding compositions.

26. The Fitko '163 patent itself states that the purpose of adding wax to resin coated sand is that the wax acts "as a lubricant or release agent when the coated sand is applied to a metal pattern," and that it also acts to achieve a "reduction in power consumption for a given quality of sand being handled in a mixer." The patent then states "the combination of the unctuous material with the particles of resin coated sand results in other advantages, such as improved strength of the shell molds and better density."

[2a] As to prior art considered by the Patent Office, see Conclusion of Law 3, footnote 5.

Opinion of H. H. Grooms

27. The inventor Fitko, in making his "invention," had recognized that in preparing resin coated sand, there was a considerable strain imposed on the muller. To solve his problem, he needed, for his requirements, a lubricant or wax having certain physical properties. He asked a wax salesman from Glyco Products, Inc. for a wax having these physical properties, and the salesman said, "That sounds like our Acrawax C," and the salesman sent a sample of Acrawax to Fitko. Fitko tried it; it worked. He admitted that he fully expected it to work not only as a plasticizing agent, but also as a mold release agent, and as a lubricant.

28. Fitko stated in his patent that he added wax to the resin coated sand for the purpose of obtaining mold release, resin plasticity, free-flowing particles and reduced power consumption in the muller. He admitted that he obtained and expected all of these advantages.

29. After having added the wax and after having achieved all these expected results, the patentee then ascertained that he had unexpectedly obtained the additional advantage noted in the patent, namely, increased tensile strength and greater density or packing of the material, and that this unexpected result came about because the wax acted as a lubricant, causing the particles to slide with respect to each other and thus pack more densely. The ability of wax to act in this manner was known in the art, and should also have been expected.

30. At the time of the Fitko '163 application, the prior art revealed that it was known to add wax as a mold release agent, a lubricant, and as a plasticizing agent. For example, in:

Principles of High-Polymer Theory and Practice, by Schmidt and Marlies (1948), p. 319, Section 806, "Lubri-

cants are used to prevent molded pieces from sticking to the mold."

The Chemistry of Synthetic Resins, by Ellis (1935), Vol. II, p. 1276, "The tendency of molding compositions to stick to the mold may be best overcome by the inclusion of a lubricant . . . Stearic acid, stearates, and metallic soaps[3] are extensively used for such purposes."; and p. 1328, "An effective method is to grind the metallic soap with the otherwise finished molding composition in such a manner that each particle becomes coated with the finely ground lubricant."

British Patent No. 532,952, issued February 4, 1941, although relating to abrasive articles, taught that "The addition, in small amounts, of a lubricant such as calcium stearate, to the mix is also of assistance in avoiding sticking."

Novotny Patent No. 1,901,325 taught that "china wood oil, dibutyl phthalate, metallic soaps, and oleates such as oleic acid" could be used as plasticizers.

Commercial Waxes, Natural and Synthetic, edited by H. Bennett (1944), p. 331, states under "Plastic Molding . . . (1) The wax, in a plastic composition, lubricates the surface and reduces the tendency of the plastic to stick to the mold;[4] (2) it lubricates the particles of the compound in themselves, thus reducing the friction and, consequently, increasing the effective plasticity of the molding material during its plastic stage in the mold . . . ."

31. The subject matter of the Fitko '163 patent is a resin coated sand molding composition to which wax has been added, the wax, as described in the claims, being in the form of an "outermost enveloping film," and "all

[3] Calcium stearate is a metallic soap.

[4] Mold release.

enveloping film" . . . completely enveloped by an . . . outer film layer" of . . . on the surface of the resin coated sand particles.

32. Whether the patent covers a complete continuous outer film of wax or whether it covers a product where wax is distributed over the surface of the resin coated molding material, the evidence warrants the finding that the state of the art was such that it would have been obvious to add a wax or lubricant to coat the surface of the particles of a molding composition used in a "shell molding" process. The discovery of the result of the increased strength of the mold flowed naturally "from teachings of the prior art."

INFRINGEMENT

33. Stockham has made resin coated sand for use in core blowing machines since about 1961, and makes and uses twenty to thirty 500-pound batches of resin coated sand daily. The process of resin coating employed by it was developed with the advice and assistance of sales representatives of Reichhold Chemicals, Inc.

34. There are two basic types of processes performed by defendant in making the accused resin coated sand. One of these, which employs the resin in liquid solution, includes the following steps:

a. 500 pounds of sand, either Hardy B-2 sub-angular sand or M-100 round sand, are pre-heated to a temperature of approximately 245° F. and charged into a pug mill.

b. 26 pounds of Reichhold type 192-9M liquid phenol formaldehyde resin (comprising 67% to 69% of resin solids dissolved in methanol) is added to the pug mill and mixed for about one minute.

c. When the temperature of the mix is approximately 215° F., approximately 3 quarts of an aqueous solution of hexamethylenetetramine (formed by mixing 80 pounds of hexa with 15 gallons of water) is added, causing the temperature to drop to approximately 200° F.

d. Mixing is continued for approximately 1-3/4 to 2 minutes, at which time the mix begins to "ball" up in the mill. About 4% to 5% of powdered calcium stearate based on the weight of resin is then added.

e. Mixing is continued for approximately 2 minutes, and the coated sand is dumped onto a vibrating screen which breaks down any lumps and reduces the mass to individual grains.

The stick point of the resulting resin coated sand, as measured on a conventional metal test bar heated at one end, is about 215° F. (101.6° C.).

The other Stockham process is similar except that:

a. The sand is pre-heated to a higher temperature of approximately 375° F. and a solid, flaked Reichhold type 7520 phenol formaldehyde resin is added.

b. After mixing for about 1½ minutes, quench water is added to reduce the temperature of the mix to about 200°-225° F., at which time the hexa solution is added.

35. Claims 1, 2, 3, 5, 6, 8, 9, 10, 11 and 16 of the Bean patent No. 2,991,267 are in suit. Claim 1, which is the broadest of these claims, reads as follows:

"1. A dry, free-flowing, self-bonding, granular composition for forming into foundry casting molds and the like while in said dry and free-flowing state and consisting of individually coated sand granules, the coatings thereon being dry and non-adhesive films of thermosetting resin binder for adhering said individual granules together upon activation and setting of said binder at the points of contact

among said granules into a rigid foundry mold but being dry and non-tacky prior to said activation and setting for maintaining said free-flowing condition of said composition."

The language of this claim is applicable to the products of both of the coating processes employed by defendant.

36. Claim 2 is similar to Claim 1 but adds that the resin films are "non-tacky' and "substantially continuous." The resin coating on defendant's coated sands is non-tacky. It is also substantially continuous as is clearly shown by photomicrographs.

37. Claim 3 is dependent upon Claim 2, adding that the sand grains are "washed," "substantially round" and "finer than 50 mesh." Both the Hardy B-2 and the M-100 sands used by Stockham are "washed" grains of "finer than 50-mesh" grain size. However, only the M-100 grains are "substantially round."

38. Claims 5 and 6 are also dependent upon Claim 2, adding that the amount of the resin binder is respectively substantially "½% to 5%" and "1% to 4%" by weight of the sand. The resin content of the Stockham resin coated sand is approximately 3.6%, and falls within the ranges specified in each of these claims.

39. Claim 8 is likewise dependent upon Claim 2, adding that "the thickness of the binding material coating is approximately 0.0001 inch, whereby adjacent granules . . . substantially touch one another while open interstices remain therebetween." The resin coating is too thin and too irregular in conformation to permit measurement, its thickness can be computed arithmetically as slightly less than 0.0001 inch. It is thin enough to leave open interstices between the grains.

40. Claim 9 contains the same language as Claim 2, but adds that the thermosetting resin is "in a thermoplastic plastic stage, which means that upon heating, the resin coating initially will soften sufficiently to permit the fusion of the coatings of adjacent granules at their points of contact. The resin coating of the Stockham sand will soften to this extent, for example, when the sand is dropped upon a heated pattern or test bar.

41. Claims 10 and 11 contain the same language as Claims 2 and 9, respectively, but add that the resin is a "phenolic". The resin employed by Stockham is a phenolic, specifically, phenol formaldehyde.

42. Claim 16 is generally similar to Claim 2 but describes the resin as "becoming tacky at elevated temperatures" before setting. The resin coating of the Stockham sand satisfies this description.

43. All of the language of Claims 1, 2, 3, 5, 6, 8, 9, 10, 11 and 16 of patent No. 2,991,267 is literally applicable to the resin coated sand made and used by defendant, with the sole exception that Claim 3, which calls for a round sand, is not applicable to the resin coated sand made with the Hardy B-2 sub-angular sand.

44. The resin coated sand made and used by defendant performs the same function in the same way to accomplish the same result as the resin coated sand disclosed and claimed in patent No. 2,991,267 and is the full equivalent thereof.

45. Only Claim 1 of Bean patent No. 2,914,823 is in suit. It covers a casting mold made with resin coated sand. The claim reads:

"1. A casting mold the walls of which are composed of grains of sand which have been individually pre-coated with dry films of thermosetting resin binder adhering to said grains, the binder on adjacent grains being bonded together and thermoset around the points of contact and the films between said contact points being so thin as to leave substantial open interstices for escape of gases through said mold".

46. In the specification of the '823 patent, at Page 1, Column 1, line 43 et seq., the terms "molds" is defined as including ". . . cores, which are here considered a type of mold. . . ."

47. All of the language of Claim 1 is literally applicable to the cores made by defendant using resin coated sand.

48. Claims 7 and 8 of Fitko et al. patent No. 2,706,188 were sued upon. Both claims are directed to a resin coated sand made with a two-step or novolak phenol formaldehyde resin partially reacted with hexamethylenetetramine to produce a "melting" point (i.e., stick point) in the range of 80° to 102° C. Plaintiffs are no longer pressing Claim 7, since it covers only "normally liquid" resin, not used by defendant.

49. Claim 8 reads that "each sand particle is coated with about 2-4% by weight of a film of a potentially thermosetting resin . . ." It omits the use of the words "normally liquid" as applied to the resin employed and as used in Claims 1 through 7; nevertheless, the patent is plainly limited to the use of "normally liquid" resin. It does not mention any other type of resin to be employed. The specifications teach that:

"[I]t is particularly advantageous to employ THE LIQUID RESIN MATERIAL more particularly described and

claimed in the copending application of Chester W. Fitko, Serial No. 297,394 filed of even date herewith. More specifically, said resin composition is composed of an acid-catalyzed phenol-formaldehyde resin which is normally permanently fusible; is NORMALLY LIQUID, i.e., in liquid condition as formed and employed . . ." Col. 2, ll. 23-30 (Emphasis supplied).

"During this heating the volatiles are removed from the INITIALLY LIQUID RESIN . . ." Col. 2, ll. 61-62 (Emphasis supplied).

. . . [D]esirably good flow is obtained by the practice of the coating process described, as distinguished from the prior practice of directly employing a dry mix, OR AS DISTINGUISHED FROM THE EMPLOYMENT OF AN INITIALLY SOLID RESIN DISSOLVED IN A SOLVENT even though it may be of the class which is made with a molar deficiency of formaldehyde, or the employment of the latter solution OR EVEN THE LIQUID RESIN OF THE PRESENT INVENTION . . ." Col. 3, ll. 10-17 (Emphasis supplied).

50. Co-inventor Fitko admitted that Fitko '188 contribution was limited to "normally liquid" resins, and co-inventor Horn considered the subject matter of the invention as avoiding the use of solid resins. The Patent Office file history of the patent distinguishes the use of its "normally liquid" resin from solid resin. In a later filed application (346,534—April 2, 1953) covering a "normally solid" resin, Fitko and Horn stated that its copending application No. 297,396, upon which '188 was issued, employed a "normally liquid" resin. The temperature limitations of 80-102° C. in the claims of Fitko '188 are applicable only to normally liquid resins. When the '188 application was filed, the inventors had never worked with solid resins. Their employer, Acme Resin Corporation, was without facilities for the production of solid resins. When it acquired

such facilities, it no longer needed to use the process of the '188 patent and its use was abandoned.

51. The '188 patent is limited to "normally liquid" resins. Reichhold 192-9M resin, which is employed by the defendant in liquid form in one of its processes, is actually a normally solid Reichhold type 7520 resin dissolved in methanol. In the other process defendant uses a solid, flake Reichhold type 7520. As stated in Finding 48, defendant does not use "normally liquid" resins, and the resin coated sand made by it does not fall within Claim 8 of Fitko '188 as concededly is the case as to Claim 7.[48]

52. Plaintiffs have not used the patents to exclude competition, but have made them available for licensing collectively to all foundries and all manufacturers of foundry resins at a maximum royalty of 3/8c per pound, which represents only about 1½% of the current market price of the resin. The evidence does not show that plaintiffs have ever refused an offer from a prospective licensee to take a license under less than all of the group of patents. It shows that Union Carbide Corporation has two separate licenses, one of which covers only the patents of Schmitt Foundation, and that Union Carbide currently pays royalties under that license only.

53. Most of plaintiffs licenses have been granted to manufacturers of the resin rather than to foundries, although the patents do not cover the resin itself but resin coated sand and foundry molds made therewith. The resin in question is not a staple commodity of commerce suitable for substantial noninfringing use, but is especially formulated for use in making resin coated sand as claimed in the

[48] See Appendix for finding of infringement as to No. 2,706,163, if patent be finally held valid.

patents. The resin manufacturers sell it for this specific end-use, their sales literature describing and their sales representatives even demonstrating to foundry purchasers the process of the coating of sand with such resins. Plaintiffs made a bona fide attempt to license foundries directly and obtained at least one active foundry licensee. They directed their licensing efforts at resin manufacturers only at the insistence of the foundries.

54. Plaintiffs' licenses provide for reasonable royalties which are on a sliding scale and which permit a reduced royalty rate at higher levels of resin sales. Only the two largest manufacturers of licensed resin, Hooker Chemical Corporation and Acme Resin Co. currently have sales large enough to obtain the benefit of this sliding scale. The royalty rates are not discriminatory, since all licensees enjoy the same royalty rates on the same volume of sales.

55. Hooker urged plaintiffs to persuade another licensee, Monsanto Company, to discontinue its policy of dual pricing—that is, publishing a price list showing two prices for its foundry resin, one without a license under the patents, and another (higher than the first by the amount of the royalty) which includes a license. Monsanto actually did discontinue this policy thereafter, and, like Hooker and other licensees, has paid a royalty on resin sales to foundries except where the foundry expressly stated that it did not want a license, in which event the resin price is reduced by the amount of the royalty. Although this requires an affirmative act on the part of the foundry to avoid paying the cost of the royalty, this is reasonable in view of the fact that the resin is especially formulated and recommended for resin coating of foundry sand.

56. The activities of the plaintiffs in their licensing of the patents do not amount to a misuse rendering the patents unenforceable.

57. Every Finding of Fact deemed a Conclusion of Law is hereby adopted as a Conclusion of Law.

Conclusions of Law

From the foregoing Findings of Fact the Court concludes as follows:

1. This Court has jurisdiction of the parties and of the subject matter of this action.

2. Plaintiffs are the owners of the patents in suit.

3. Claims 1, 2, 3, 5, 6, 8, 9, 10, 11 and 16 of the Bean patent No. 2,991,267; Claim 1 of Bean patent No. 2,914,823, and Fitko-Horn patent No. 2,706,188 are valid.

Every patent is presumed to be valid. Title 35 U.S.C.A. § 282. The burden to make good the defense of invalidity is a heavy one, and every reasonable doubt should be resolved against the party setting up such defense. Mumm v. Jacob E. Decker & Sons, 301 U.S. 168, 57 S. Ct. 675, 676; Samuelson v. Bethlehem Steel Company, 5 Cir., 323 F. 2d 944, 947. The presumption of validity is strengthened when the prior art cited by the Patent Office is at least as relevant to the claimed invention as the art relied upon in attacking the patent. Southern States Equipment Corp. v. USCO Power Equipment Corp., 5 Cir., 209 F. 2d 111; Arnold Pipe Rentals Co. v. Engineering Enterprises, Inc., 5 Cir., 350 F. 2d 885, 890; Jeoffroy Mfg., Inc. v. Graham, 5 Cir., 219 F. 2d 511, 519.[5] The citation of a large number of prior patents and publications is evi-

[5] Some of the more relevant of these are: Aylsworth No. 1,090,439, cited against Bean '267 and Fitko '188; Robie No. 2,203,321 and Weston No. 2,517,815 cited against both Bean patents and Fitko '188; Grube No. 2,491,006 and Richardson No. 1,508,124, cited against Fitko '188.

dence of the weakness of the contentions as to invalidity. Reynolds v. Whitin Mach. Works, 4 Cir., 167 F. 2d 78, 83, and cases there cited.

4. The patents described in Conclusion No. 3 were not anticipated by any of the prior patents or publications relied upon by the defendant.

5. The patented inventions described in Conclusion No. 3 were not obvious to persons having ordinary skill in the art. They meet the test of non-obviousness prescribed by Title 35 U.S.C.A. § 103. Obviousness should not be determined by hindsight, Arnold Pipe Rentals Co. v. Engineering Enterprises, Inc., supra; Duo-Flex Corporation v. Building Service Company, 5 Cir., 322 F. 2d 94, 96-97, but must be determined by (1) the differences between the prior art, after the scope and content of the latter have been determined, and the claims at issue, and after the level of ordinary skill in the pertinent art is resolved, Graham v. John Deere Co., 383 U.S. 1, 86 S. Ct. 684, 694; and by (2) an evaluation of historical events and conditions, as stated by the Court in Graham:

"Against this background, the obviousness or non-obviousness of the subject matter is determined. Such secondary considerations as commercial success, long felt but unsolved needs, failure of others, etc., might be utilized to give light to the circumstances surrounding the origin of the subject matter sought to be patented. As indicia of obviousness or nonobviousness, these inquiries may have relevancy."

or as stated by Judge Hand in Reiner v. I. Leon Co., 2 Cir., 285 F. 2d 501, 503-504:

"There are indeed some sign posts: e.g. how long did the need exist; how many tried to find the way; how long did the surrounding and accessory arts disclose the means; how immediately was the invention recognized as an answer by those who used the new variant?"

Measured by these guidelines and as directed by these "signposts," the Court concludes that these three inventions were not "obvious at the time the (inventions were) made to a person having ordinary skill in the art to which (the) subject matter (of the inventions) pertains." 35 U.S.C.A. § 103. They recognized an unfilled need. Other efforts to overcome the disadvantages of the Croning process were unsuccessful. The prior art failed to teach the solution to the problems of Croning. These inventions have enjoyed very considerable commercial success and have virtually supplanted the Croning process. Generally, the contributions of the inventions have been recognized in the industry to which they pertain, and all of the substantial manufacturers of phenol formaldehyde resins for foundry use, except Reichhold, have taken licenses under the patents.

The fact that others were working so hard to achieve a solution to the problems presented by Croning emphasized the need for such a solution, confirmed the seriousness of the problems involved in Croning and the difficulty of solution. Such other work under the facts here presented, when submitted to a careful analysis, does not constitute sufficient evidence of independent contemporaneous development as to render these inventions obvious to a person having ordinary skill in the art.

6. Plaintiffs have not misused the patents nor violated anti-trust laws in their collective licensing of the patents or otherwise.

The combination of complementary patents in a single ownership is not illegal, Baker-Cammack Hosiery Mills, Inc. v. Davis Co., 4 Cir., 181 F. 2d 550, 570; International Manufacturing Co. v. Landon, Inc., 9 Cir., 336 F. 2d 723; Standard Oil Co. v. United States, 283 U.S. 163, 51 S. Ct. 421, 75 L.Ed. 926, if the combination is not used for im-

proper purposes such as were found in American Securit Co. v. Shatterproof Glass Corp., 3 Cir., 268 F. 2d 769, where competing patents were involved.

There was no misuse by the licensing of resin manufacturers rather than foundries. Calhoun v. United States (Ct. Cl.), 339 F. 2d 665, 668.

Sliding scale royalties are recognized and commonplace and do not constitute misuse. See Ellis, Patent Licenses, 3 Ed. § 129.

The payment of royalties by licenses on all sales of sand coating resin to foundries, unless the purchaser states that it does not wish a license (in which event the price of the resin is reduced by the amount of the royalty), was approved in Calhoun v. United States, supra.

7. Claims 1, 3, 4 and 5 of the Fitko patent No. 2,706,163 are invalid. The "invention" was both anticipated by the prior art patents and printed publications and was such as to be obvious at the time of the invention to a person having ordinary skill in the art. It is not invention to select a known compound to meet known requirements. Sinclair Co. v. Interchemical Corp., 325 U.S. 327.

A patent should not be granted on an obvious act which would naturally flow from the teachings of the prior art even though an unexpected advantage or result was obtained. Zero Manufacturing Co. v. Mississippi Milk Producers Ass'n, 5 Cir., 358 F. 2d 853, 855.

Obviousness is not determined on the basis of whether there was or was not a new result in a patented combination, Graham v. John Deere Co., supra, at 4, but whether or not it was obvious to combine the materials in the first place. See also, General Electric Co. v. Jewel Co., 326 U.S. 242; Floridin Co. v. Attapulgus Clay Co., 3 Cir., 125 F. 2d 669, 671, and LaMaur, Inc. v. De Mert & Dougherty, Inc., 148, USPQ 59, 72 (N.D. Ill.).

8. Claims 1, 2, 3,[6] 5, 6, 8, 9, 10, 11 and 16 of Patent No. 2,991,267, and Claim 1 of patent No. 2,914,823 are infringed by the defendant.

9. Claim 8 of patent No. 2,706,188 is not infringed by the defendant.

While it is true that a limitation in claims not in issue may not be used to restrict claims in suit, Baker-Cammack Hosiery Mills, Inc. v. Davis Co., supra, "it is elementary that claims are construed in the light of the description and to cover the real invention found in the specifications and drawings." Kinnear-Weed Corp. v. Humble Oil & Refining Co., 5 Cir., 259 F. 2d 398, 402. The claim must be interpreted in the light of the patent disclosure. Phillips Petroleum Co. v. Shell Oil Co., 5 Cir., 166 F. 2d 384, 386-7. "[A] patentee's broadest claim can be no broader than his actual invention." Kemart Corp. v. Printing Arts Research Laboratories, Inc., 9 Cir., 201 F. 2d 624, 629. See also Dominion Magnesium Limited v. United States, (Ct. Cl.) 320 F. 2d 388, 394; Huntman Stabilizer Corp. v. General Motors Corp., 3 Cir., 144 F. 2d 963, 967. "[N]o claims are to be read in abstractu." Clark v. Wright Aeronautical Corporation, 2 Cir., 162 F. 2d 960. The teachings of the specifications of the invention concern the use of "normally liquid" resins only, and the use of such resins "is distinguished from the employment of an initially solid resin dissolved with a solvent." Otherwise, the words "initially solid resins" are not employed. The use of "normally liquid" resin may fairly be construed as a basic teaching of the patent. See Fritz W. Glitsch & Sons, Inc. v. Wyatt Metal & Boiler Works, 5 Cir., 224 F. 2d 331, 335, footnote 7, where it was said:

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[6] Claim 3 describes the sand grains as "substantially round." The infringement would be applicable only to the M-100 sand and not to the sub-angular Hardy B-2 sand.

"True the claims of the patent define and measure the invention, and they contain no express limitation as to the use of stainless steel in the patented structure, but we think Glitsch significantly fails to mention any other lightweight, flexible, and noncorrosive metal so readily adaptable and commercially feasible for bubble tray use to that, irrespective of the broad language of the claims, the use of stainless steel in a bubble tray structure may fairly be construed as a basic teaching of the patent."

In an infringement suit a person may not take a position inconsistent with the one he maintained before the Patent Office, Straussler v. United States, (Ct. Cl.) 290 F. 2d 827, 830, as where he has changed his position either by amendment or advocation of a limiting construction which would work an implied disclaimer. United States Pipe and Foundry Co. v. James B. Clow & Sons, Inc., (N.D. Ala.) 205 F. Supp. 140, 151. See Finding 50. Stockham did not use a "normally liquid" resin.

10. An invalid patent cannot be infringed. New Products Corp. v. Outboard, Marine & Manufacturing Co., 7 Cir., 263 F. 2d 521. But if patent No. 2,706,163 be finally held valid, it is infringed as found in the Supplemental Finding of Fact set out in the Appendix.

11. Every Conclusion of Law deemed a Finding of Fact is adopted as a Finding of Fact.

12. Plaintiff Morris Bean & Company, a corporation, is entitled to the following relief:

(1) An injunction under Title 35 U.S.C.A. § 283 against the defendant enjoining further infringement, direct or contributory, of each of Claims 1, 2, 3, 5, 6, 8, 9, 10, 11 and 16 of patent No. 2,991,267, and Claim 1 of patent No. 2,914,823.

(2) An accounting, pending which, and under the authority of E-I-M Company v. Philadelphia Gear Works, Inc., 5 Cir., 223 F. 2d 36, the Court withholds a determination as to whether the infringement has been willful and deliberate and whether on account thereof the plaintiff is entitled to a multiple award of damages under Title 35 U.S.C.A. § 284, and attorney's fees under Section 285. Jurisdiction as to both matters is specifically reserved.

(3) Three-fourths of the costs will be taxed against the defendant, and one-fourth against the plaintiff Schmitt.

Counsel will submit an appropriate form of judgment for the Court's consideration.

Done and Ordered, this the 28 day of October, 1966.

H. H. Grooms
United States District Judge

APPENDIX

Supplemental Findings of Fact

51 a. Claims 1, 3, 4 and 5 of patent No. 2,706,163, which are in suit, in general terms are directed to a resin coated sand having an outer layer of waxy material, which the specification discloses as functioning to increase the strength of the shell molds formed with the sand.

Claim 3 is in most respects the broadest claim. It reads:

"3. Free-flowing, storage-stable particles of sand individually coated with from about 2 to 4% by weight of a solid, nontacky layer of potentially thermosetting resin, said resin layer carrying an outermost enveloping film of

solid nontacky heat liquefiable waxy material having a melting point at least substantially that of the resin coating on the sand and substantially insoluble therein in solid condition and in the proportion of from about 0.5 to 8% by weight of the resin."

The calcium stearate employed by defendant in its resin coating process is a heat liquefiable waxy material. It increased the strength of the shells formed with the coated sand. Claim 3 does not require that the waxy material be in the form of a continuous, lacquer-like coating and is fully compatible with the discrete, particulate condition. It does not require that the calcium stearate layer cover the entire surface of the grains. A test conducted without pressure (as distinguished from defendant's test under 2000 pounds psi pressure) applied to the mixture of resin and calcium stearate indicated substantial insolubility of the stearate in both the liquid and the solid resin.

b. Claim 1 is similar to Claim 3, but omits the description of the outer film of waxy material as "enveloping" and describes the resin coating and the waxy material as forming a "blended dual layer"; it further describes the resin coated sand as "dustless." The term "blended dual layer" means that there is not a sharp demarcation between the outer layer of waxy material and the inner layer of resin but instead that the two layers blend into one another, with a greater concentration of waxy material on the outside and a greater concentration of resin on the inside. The dustlessness of defendant's resin coated sand was shown both by pouring tests and by screen analyses.

c. Claim 4 is the same as Claim 3 in describing the resin layer as carrying the waxy material as "an outermost enveloping film" but adds that the resin coated sand particles are "discrete" and that the resin is "normally thermoplastic" and is a "phenol formaldehyde . . . including and

partially reacted with hexamethylenetetramine." The particles of defendant's resin coated sand are "discrete." This is shown by screen analyses which established that the coated sand has a particle size distribution not substantially different from that of the uncoated sand.

d. Claim 5 is also similar to Claim 3 but describes the waxy material as forming an "all-enveloping" film, and states that the resin coated sand is "adapted for production of shell molds of increased density and tensile strength," that the waxy material is "adapted to act as a pattern lubricant."

e. Tests of defendant's resin coated sand, with and without the addition of calcium stearate, establish that the stearate increased the flowability of the sand, its density of packing and the strength of the resulting shells to an extent greater than would be expected from the small amount of stearate added (0.18% based on the weight of sand), indicating that the stearate is concentrated at the outer surface of the resin coating and substantially completely envelops the grains. A test involving addition of a dye which stains the calcium stearate, but not the resin nor the sand, confirmed that the stearate forms a complete outer envelope about defendant's resin coated grains.

f. All of the language of Claims 1, 3, 4 and 5 of patent No. 2,706,163 is literally applicable to the resin coated sand made and used by defendant.

g. Defendant's resin coated sand performs the same function in the same way to achieve the same result as that disclosed and claimed in patent No. 2,706,163 and is the full equivalent thereof.

Judgment of the District Court

Filed Dec. 9, 1966.

This action having been tried and the Court having entered Findings of Fact and Conclusions of Law on October 28, 1966, it is hereby Ordered, Adjudged and decreed:

1. Claims 1, 2, 3, 5, 6, 8, 9, 10, 11 and 16 of the Bean U. S. patent No. 2,991,267 are valid and have been and are being infringed by defendant.

2. Claim 1 of the Bean U. S. patent No. 2,914,823 is valid and has been and is being infringed by defendant.

3. Claim 8 of the Fitko and Horn U. S. patent No. 2,706,188 is valid, but has not been infringed by defendant. Except for the adjudication hereof of the validity of said Claim 8 of said patent, the Complaint is dismissed as to said Claim 8 of said patent.

4. Claims 1, 3, 4 and 5 of the Fitko U. S. patent No. 2,706,163 are invalid but, if valid, have been and are being infringed by defendant. Except for the adjudication hereof that said Claims 1, 3, 4 and 5 of said patent, if valid, have been and are being infringed by defendant, the Complaint is dismissed as to said Claims 1, 3, 4 and 5 of said patent.

5. Plaintiffs have not misused any of said patents nor violated anti-trust laws in their collective licensing of the patents or otherwise, and all of said patents, to the extent to which they are valid and infringed, are enforceable.

6. Defendant and its officers, employees and agents are hereby restrained and enjoined from making, using or

selling within the United States, its territories or possessions, resin coated sand as covered by Claims 1, 2, 3, 5, 6, 8, 9, 10, 11 and/or 16 of said patent No. 2,991,267 and/or foundry molds or cores or other parts thereof as covered by Claim 1 of said patent No. 2,914,823, during the respective remaining terms of said patents. However, the injunction herein granted is stayed pending the expiration of the time for an appeal from the judgment entered herein.

7. Plaintiff Morris Bean & Company is awarded damages for defendant's infringement of said patent Nos. 2,991,267 and 2,914,823 in an amount to be determined by an accounting which is deferred pending disposition of any appeals from this judgment. At the time of such accounting, this Court shall determine whether defendant's infringement has been willful and deliberate and whether on account thereof plaintiff is entitled to an award of multiple damages under 35 U. S. C. § 284 and attorneys' fees under 35 U. S. C. § 285, and the Court reserves jurisdiction for these purposes.

8. Two-thirds of the costs are taxed against defendant and one-third against plaintiff Arthur J. Schmitt Foundation. Bills of costs of the respective parties shall be filed in the Clerk's Office within fifteen days after entry of this judgment.

Birmingham, Alabama, December 9, 1966.

H. H. Grooms,
United States District Judge.

Stockham's Petition for Rehearing

Petitioner, Stockham Valves & Fittings, Inc., respectfully petitions this Court for a rehearing *en banc*, pursuant to Rule 35(b) F.R.A.P., with respect to so much of its decision dated November 22, 1968 as upholds the validity and infringement of U. S. patents Nos. 2,991,267 and 2,914,823.*

The Gravamen of the Petition

The grounds upon which this petition is based are:

I. That this Court's *per curiam* and summary opinion (App. Doc. No. 1) upholding the validity of the '267 patent results in an application, as a matter of law, of a standard of invention plainly contrary to the mandative standard of invention enunciated by the Supreme Court in *Graham* v. *Deere*, 383 U.S. 1 (1966) and equally contrary to the standard which this Fifth Circuit Court of Appeals thereafter announced it would apply as the rationale of decision in patent cases in *Zero Manufacturing Company* v. *Mississippi Milk Producers Ass'n*, 388 F.2d 853 (C.A. 5, 1966); *Sisko* v. *Southern Research & Fiberglass Corporation*, 373 F.2d 866 (C.A. 5, 1967); and *National Filters, Inc.* v. *Research Products Corporation*, 384 F.2d 516 (C.A. 5, 1967).

II. That, although the issues with respect to two additional patents not at issue on this petition were technologically complicated and involve a major portion of the record below, the answer to the question of validity with respect to the '267 patent is definitely not contingent upon

* The '823 patent covers a product made from the composition covered by the '267 patent (resin coated sand) and the questions of validity with respect to both are identical. Accordingly, this petition will discuss only the asserted inventive subject matter of the '267 patent.

resolving conflicting testimony. The basic facts are not seriously in dispute and reside in documentary evidence of such plain pertinency that a holding of validity, in the light of the Supreme Court's and the Fifth Circuit's applicable standard of invention, is, to petitioner, inexplicable, or at least highly questionable. Yet, although such documentary evidence (prior art) warrants a strong advocacy of the contention of direct anticipation of the invention and, *a fortiori*, warrants the most serious consideration on the question of invention, the District Court did not undertake to discuss or refer, or advert to it in any way, in its opinion, nor did this Court of Appeals.

III. It is suggested that this petition for rehearing be directed to and heard by this Court *en banc* because we believe the result is, as a matter of law, inconsistent with the application of the standard of invention which should predictably be applicable to patents in this Circuit. When the question of the application of a standard of invention was raised in the United States Supreme Court, that Court for the first time in fourteen years reviewed a patent case and set forth the applicable standard. The Court of Appeals for the Ninth Circuit, the Court of Appeals for the Seventh Circuit and other Circuits, since the *Graham* case, sat *en banc* for the specific purpose of considering and enunciating a standard of invention which could be expected to be uniformly applied to a variety of technological factual situations. We respectfully suggest that this is compellingly such a case.

The Law and Rationale of Decision in the Supreme Court and in This Circuit

The manner in which the rule with respect to the standard of invention is to be uniformly applied by the District

Courts and the Circuit Courts was clearly and purposefully set forth by the Supreme Court in *Graham* v. *Deere, supra,* pp. 6, 17:

> " • • • Congress may not authorize the issuance of patents whose effects are to remove existent knowledge from the public domain, or to restrict free access to materials already available • • • ".
>
> • • •
>
> " • • • the ultimate question of patent validity is one of law • • •, the § 103 condition [invention] • • • lends itself to several basic factual inquiries. Under § 103 the scope and content of the prior art are to be determined; differences between the prior art and the claims at issue are to be ascertained; and the level of ordinary skill in the pertinent art resolved. Against this background, the obviousness or non-obviousness of the subject matter is determined."

This Court of Appeals, following that decision of the Supreme Court, gave notice to the bar, the litigants and the public that it was applying *that* test to the validity of patents, in the *Zero, Sisko* and *National Filters* cases, *supra.*

In the *Zero* case, *supra,* p. 855, this Court held:

> " • • • the scope and content of the prior art were such that whatever inventive thought the two patents may have evidenced, the subject matter showed no substantial differences from the prior art; • • • the skill level of neither rose higher than that achieved in the prior art. We are thus impelled to the conclusion that both patents are invalid, as the differences between them and the pertinent prior art would have been obvious to a person reasonably skilled in the art".

In the *Sisko* case, *supra*, p. 868, this Court again held that the question of invention was one resolved by an inquiry:

> " • • • to be directed to the scope and content of the prior art and practices, the differences between the prior art and practices and the claims at issue, and the level of ordinary skill in the art involved".

In the *National Filters* case, *supra*, p. 518, this Court set forth a principle with respect to the importance of the fundamental element of the similarity of *inventive concept* in the prior art and the alleged claim to invention. The documentary evidence of the prior existence of substantially the same *inventive concept* in this case certainly places in serious question, in petitioner's mind, whether such principle could have been an element properly weighed in reaching the result.

> "Obviousness is measured in terms of one skilled in the art. Whether others skilled in the art, working independently, previously have arrived at the same concept is highly informative in determining obviousness, and if they did arrive at the same concept the relevancy of that fact is not destroyed by their lack of commercial success".

The Seventh Circuit Court of Appeals in *Armour & Co.* v. *Wilson & Co.*, 274 F.2d 143, 156 (1960), where that Court sat *en banc* for the specific purpose of resolving the rationale of decision in patent cases, stated with respect to the *facts* found by the District Court:

> "We examine the standard of invention applied to these facts as a *question of law* as we have done in other areas". (Emphasis added.)

Stockham's Petition for Rehearing

In appellant's Reply Brief, we said:

> "It is now apparent that plaintiffs have placed primary reliance upon some secondary considerations, namely, the alleged commercial success of the patents in suit, the alleged failure of others, and peripheral issues relating to savings in percentages of resin, type and size of granules used, and the like. No real attempt however has been made to evaluate or measure the alleged technological advance of resin coated sand over the art, the teachings of which are largely documentary and about which there can be, and is, no dispute".

This was simply a request for this Court to examine the District Court's rationale of decision, which in fact followed plaintiff's secondary considerations, and for this Court *itself* to apply to the facts found below, and to the facts undisputed in the record, the standard of invention which this Court of Appeals had promulgated.

The District Court's opinion on its face reflects that such a measure or evaluation was not made. Two primary references, the Less '067 patent and the Foundry Trade Journal, the pertinency of both of which would excite the interest of a patent searcher, even one not at all skilled in this art, were not even referred to in the Court's opinion or Findings. Perhaps this was so because there was not a great deal of testimony about them. They substantially speak for themselves. This Court of Appeals' opinion similarly does not specifically reflect any consideration of the same material. On the other hand detailed findings were made by the District Court with respect to some prior art references which were not even relied upon by defendant in its brief below!

Although there exist four additional abrasive art patents which plainly speak for themselves and which make, at

least for us, most perplexing the result in the instant case;* although there are at least three incidents of contemporaneous independent invention plainly supported by documentary service;** although the foundry industry had been using resin coated sand for about ten years while the composition of the claimed invention was not disclosed by the patentee and was dormant in the Patent Office;*** and although none of the prior art patents in this case were cited in the Patent Office prosecution, the plaintiff-patent owner plainly admitting that the same arguments made there resulting in issuance of the patent could not have been made if prior art in this case was before the Patent Office, we do not directly predicate this petition for rehearing upon these factors.**** While this petition is based primarily upon the specific documentary evidence identified herein, it is hoped, and respectfully suggested, that the interests of justice would move this Court, *en banc,* to consider those portions of appellant's Reply Brief herein identified, if the grounds upon which this petition is formally predicated raise some doubt about the validity of the conclusion reached.

The gravamen of this petition is that this Court of review has committed error, as an Appellate Court, with respect to analyzing the Findings of Fact of the District Court to ascertain their actual nature and scope, reviewing the record as to those portions identified as documentary and undisputed, and then applying the standard of invention which this Court itself has promulgated to such facts.

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* Appellant's Reply Brief, pp. 28-30.

** Appellant's Reply Brief, pp. 19-22.

*** Appellant's Reply Brief, p. 27.

**** Appellant's Reply Brief, p. 29.

Stockham's Petition for Rehearing

SPECIFICATION IN SUPPORT OF PETITION

Subject Matter of the Bean '267 Patent (App. Doc. No. 2)

The claims of the Bean '267 patent are *product claims.* The patented *product* is simply sand grains which are coated with resin. The alleged novelty of this resin coated sand is based upon only three distinguishing characteristics. The resin coated sand grains must be (i) *dry and free flowing;* (ii) each grain must be *individually coated* with resin and (iii) the resin must be a *thermosetting resin.** Plaintiff has not disputed that the patented product is no more than resin coated sand having these aforesaid characteristics.

If the prior art teaches or discloses resin coated sand having these three distinguishing features, the Bean '267 patent is invalid for claiming an old or obvious product and certainly does not meet this Fifth Circuit's standard of invention test.

That this is the alleged inventive subject matter of the Bean '267 patent is demonstrated by the file history of the patent, the admission of the inventor, and the claim language itself.

During the prosecution of the application for the '267 patent, the patentee represented that (R. 1666-7):

> "The coating of sand grains with *individual coating* of a solid, *non-tacky* [dry] potentially *thermosetting* resin is the evident subject of this application * * * ".

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* No claims to a unique or novel process exist with respect to the making of such a product.

The patentee continued to represent that the novelty of the invention was based upon these three features recited in the patent claims, namely, the resin coated sand must be (i) *dry and free flowing,* (ii) the sand granules must be *individually coated* with the resin and (iii) the resin must be a *thermosetting* resin. Bean pointed out to the Patent Office that no single prior art reference disclosed all three of these features.

When the Patent Office first cited the prior art Weston U. S. patent No. 2,517,815, Bean argued that although the reference disclosed resin coated sand granules which are (i) dry and free flowing and which are (ii) individually coated with a resin, (iii) *the reference did not disclose that the resin was a thermosetting resin* (R. 1679):

> "* * * Weston may be read to suggest the coating of sand particles with a resin. Specifically, however, Weston's resin is taught as being 'nonthermosetting' * * *. By contrast, the preferred embodiment of applicant's binder is intentionally of a thermosetting type * * *."
>
> * * *
>
> "Accordingly, Weston does not teach a dry or free flowing mass of discrete sand grains each of which is coated with a dry and non-tacky coating of *thermosetting* resin. Weston's sand is coated with a 'non-thermosetting' resin * * * ". (R. 1697)

When the Patent Office cited Valyi patent No. 2,521,614, Bean argued that although the reference discloses resin coated sand granules which were (i) individually coated with a (ii) thermosetting resin, (iii) *the reference did not disclose that the resin coated granules were dry and free flowing* (R. 1698-9):

> "Similarly, Valyi fails as a reference, again because there is no teaching therein of sand particles

> *individually coated with a dry film of thermosetting resin.* * * * There is no teaching in Valyi of a molding composition formed of a dry mass of molding sand the particles of which are individually coated with a dry film of thermosetting resin."

When the Patent Office cited Aylsworth U. S. patent No. 1,090,439, Bean argued that although the reference disclosed resin coated sand granules which were (i) dry and free flowing and which are (ii) coated with a thermosetting resin, (iii) *the reference did not disclose that the sand granules were individually coated* (R. 1698):

> " * * * there is no teaching in Aylsworth of individual sand granules (or even silica particles or woodflour particles) *individually coated* with an enveloping film or dry thermosetting resin. * * * "

The patentee then stated (R. 1699):

> " * * * at no time in the Weston teaching is there formed or suggested a dry sand with the *individual particles thereof enveloped* in a *dry and non-tacky* coating containing *thermosetting* resin * * *."

On the basis of these representations regarding the essential features cited in the claims, the Patent Office allowed the present claims on the understanding that the issued claims were (R. 1701-2):

> " * * * limited to powdered molding material consisting of separate and individual particles each of which is coated or enveloped in its own *individual film* of *dried* non-tacky *thermosetting* resin * * *."

At trial, the inventor again defined the subject matter of the alleged invention in the same manner it had been defined in the Patent Office (R. 865):

> "Q. * * * am I right when I say that your invention here is a *dry* granular material that is coated with a thermosetting resin, *individually coated* with a *thermosetting* resin, period? A. No, not period.
>
> "Q. All right, what is it? A. It is a dry, free-flowing granular material that is non-tacky."

The specification of the Bean '267 patent states (R. 1371, col. 2, ll. 30-8):

> "According to the present invention, I coat the grains of sand (by which I mean granular refractory material, e.g., silica, alundum or zircon, etc.) with a *resin coating enveloping the grains individually.* This coat is solid and dry (i.e., non-sticky) at ordinary temperatures * * * the resin is capable of being converted to an infusible bond [a thermosetting resin] * * *."

Claim 2 of the Bean '267 patent is representative of the claims of the patent in suit. Stripped of excess verbiage, the claimed "invention" is resin coated sand granules which are (i) dry and free flowing, (ii) each granule being individually coated with a (iii) thermosetting resin.

Foundry Journal Prior Art Teaching (App. Doc. No. 3)

There is and can be no difference between the product of the patent and that of the Foundry Journal. The '267 patent actually teaches that a *natural wood resin* can be used in place of a *phenolformaldehyde* resin (R. 1373-4, col. 6, l. 72 to col. 7, l. 3) and that alcohol (*methylated spirits*)

can be used in place of acetone (R. 860; R. 1372, col. 3, ll. 46-50):

District Court Finding (R. 64)	Foundry Trade Journal (R. 1614)
"In September, 1950, Mrs. Xarifa L. Bean, Director of Research of plaintiff Morris Bean & Co., discovered that the phenol formaldehyde resin could be coated onto sand grains by dissolving the resin in a solvent, such as acetone, adding the resin solution to the sand and mulling the mixture until the solvent fully evaporated. The resulting coated grains were dry, free-flowing and dustless."	"In November 1947 experiments were started on resin coated moulding sands in the grey-iron foundry * * * the principle being to coat clean silica sand with resin * * *. A solution of wood resin in methylated spirits was used * * *. The solution was added to the dry sand in an ordinary mixer. After thoroughly mixing, the sand was passed through a rotary dryer operating at approximately 200 deg. C. to evaporate the solvent and to set the resin round the sand grains. [The resulting coated grains were] similar to dry silica * * * *".

The Foundry Journal, having disclosed to the public in 1949, more than one year before the filing of the Bean patent application, a (i) *dry silica sand* in which the (ii) *individual grains were coated* with a (iii) *thermosetting resin,* clearly anticipated and invalidates the Bean patent.

Based upon the undisputed evidence, defendant in its Reply Brief at pp. 8 to 13 points out in additional detail why, as a matter of law the Bean '267 must be considered invalid in view of the Foundry Trade Journal reference.

The Less '067 Patent Prior Art Teaching (App. Doc. No. 4)

THE BEAN '267 PATENT	THE LESS '067 PATENT
"Another method is to moisten the sand and then dust with the powdered binder, which adheres in a thin coat to the moisture film on each grain" (R. 1372, col. 3, ll. 21-4. . . ."	Sand grains are first moistened and a wetting agent (adhesion agent), then a powdered phenolformaldehyde (thermosetting) resin is mixed in, such that the powdered resin adheres tightly in a thin coat around the sand grains (R. 1586, col. 1, l. 54 to col. 2, l. 8; R. 1587, col. 3, ll. 30-42).
The resin coated sand is "dry, free flowing. . . ." (R. 1372, col. 3, l. 8).	The resin coated sand is "entirely free flowing. . . ." (R. 1586, col. 2, l. 30).

It is interesting to note, as a matter of "inventive concept", that the Less '067 patent is directed to the solution of the identical problem allegedly "solved" for the first time by Bean; that is, to avoid resin segregation, eliminate dust and distribute the resin more evenly in the shell molding process.

Again, based upon the undisputed evidence in connection with the Less '067 patent, appellant's Reply Brief demonstrates (pp. 14-18) why, as a matter of law, the Bean '267 patent is invalid when measured against, as an advance, the Less teaching.*

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* The effective filing date Less '067 is December 1949, the date of the parent application. The disclosure of the Less '067 patent upon which defendant relies is nearly identical to the disclosure of Less parent application (cf. R. 1586-7 and Defendant's Exhibit 278). The Less '067 patent, being an earlier-filed (December 27, 1949) patent, is unquestionably prior art with respect to the Bean '267 (filed December 4, 1950) patent. 35 U.S.C., Sec. 102(e);

(Footnote continued on page A-56)

It is truly difficult to comprehend the District Court's statement that "None of the prior patents relied upon by defendant discloses *or suggests* any of the inventions claimed in the Bean '267 . . . patents" if the Foundry Journal and Less alone, are considered.

The Bean '267 Patent Is Invalid Over the Teachings of the Abrasive Art (App. Doc. No. 5)

A skilled foundryman would plainly look to the teaching of the abrasive art for guidance in solving the problem of resin segregation in a foundry process. Petitioner adduced overwhelming evidence of the pertinency of this art. Appellees admitted it; and so did the District Court. We respectfully ask the Court to look at appellant's Reply Brief (pp. 30-34).

That prior art shows in just one abrasive art patent, Martin 2,010,873, issued September, *1937,* the same *inventive concept* of resin coated refractory grains, *uniformly coated,* which are *non-tacky* and adapted to *bond together* to form an article!

Bean '267 (R. 1370)	Martin '873 (R. 1564)
The resin coating is "dry (i.e. non-sticky) at ordinary temperatures" (col. 2, l. 35).	The resin coating is "not sticky or tacky at ordinary temperatures" (R. 1566, col. 2, l. 26).
The resin coating is a "continuous coating of each grain of sand" (col. 3, ll. 7-8).	The resin coating "completely surrounds each grain" (R. 1565, col. 1, l. 42).

Application of LoPresti and Salmons, 333 F.2d 932 (C.C.P.A., 1964); *Hazeltine Research, Inc.* v. *Brenner,* 382 U.S. 252 (1965); *Piel Manufacturing Company, Incorporated, et al* v. *George A. Rolfes Company, et al.,* 363 F.2d 59 (C.A. 8, 1966); *In re Zenitz,* 333 F.2d 924 (C.C.P.A., 1964).

"sand (by which I mean granular refractory material, e.g. silica, alundum fused alumina)" are used (col. 2, ll. 32-3).	"fused, alumina abrasive grains" are used (R. 1565, col. 1, ll. 74-5).
"thermosetting resins" are used (col. 2, l. 63).	"heat hardenable synthetic resin" is used (R. 1568, col. 1, ll. 18-19).
"In general, the binder percentage will range between ½% and 5%" (col. 7, ll. 68-9).	"It will be appreciated that a great many variations in * * * bond content can be made," (R. 1566, col. 1, ll. 19-21).
"It is important that the distribution of the resin in the mass is uniform and thorough." (col. 3, ll. 60-2).	"the distribution of the bond is under positive control and the bond is not haphazardly spread both around and between the grains" (R. 1566, col. 2, ll. 50-2).

The District Court, rather than measuring this plainly pertinent teaching against the alleged advance, simply found that this " * * * process was used commercially to a limited extent * * * " and " * * * was discontinued because of its expensiveness".*

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* *National Filters, supra*, p. 518, holds:

"Whether prior art patents have been put to use is irrelevant to the question whether the disclosure therein constitutes anticipation * * * ".

Conclusion

Circuit Judge Morgan, who sat as part of the panel in this case, held, as a District Judge in *Mohasco Industries, Inc.* v. *E. T. Barwick Mills, Inc.*, 221 F. Supp. 191 (N.D. Ga., 1963); *aff'd* 340 F.2d 319 (C.A. 5, 1965):

> "despite concerted efforts to avoid the issuance of patents which do not meet the statutory requirements as interpreted and enforced by the courts, such patents, nevertheless, continue to be issued. *That it is the duty of the courts to protect the public against the enforcement of patents which do not meet the statutory requirements is clear.*
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> • • •
>
> "Since patents are restrictions upon the natural right of members of the public to avail themselves of the abilities of skilled artisans, and upon the right to free competition which is basic to our economic system, *monopolies based on patents must be jealously scrutinized* by the courts to make certain that they are of the character which the statutes authorize. . . ."

We most respectfully suggest that even in the light of the limited evidence to which this petition necessarily restricts us that this philosophy, which was expressed even prior to the Supreme Court doctrine in the *Graham* case, is so plainly applicable to the alleged invention at issue here that it has required us, in all sincerity, and with some perplexity, to file this petition for rehearing.

Bean U. S. Patent No. 2,991,267

(PHOTOSTATS)

(See opposite ☛)

FOLDOUTS TOO LARGE TO
BE FILMED

substantially continuous and separate non-tacky enveloping films on individual sand granules for maintaining said free-flowing characteristic of said composition and for bonding said individual granules at points of contact thereamong upon activation and setting of said binder to form a rigid mold.

10. A dry, free-flowing, self-bonding, granular composition for forming into foundry casting molds and the like while in said dry and free-flowing state and comprising essentially sand granules having thereon a dry and non-tacky coating of resin binder material including a thermosetting phenolic resin, said coating forming substantially continuous and separate non-tacky enveloping films on individual sand granules for maintaining said free-flowing characteristic of said composition and for bonding said individual granules at points of contact thereamong upon activation and setting of said binder to form a rigid mold.

11. A dry, free-flowing, self-bonding, granular composition for forming into foundry casting molds and the like in said dry and free-flowing state and comprising essentially sand granules having thereon a dry and non-tacky coating of resin binder material including a thermosetting phenolic resin in a thermoplastic plastic stage, said coating forming substantially continuous and separate non-tacky enveloping films on individual sand granules for maintaining said free-flowing characteristic of said composition and for bonding said individual granules at points of contact thereamong upon activation and setting of said binder to form a rigid mold.

12. As a dry, free-flowing, self-bonding granular composition for forming into foundry casting molds and the like while in said dry and free-flowing state, discrete and free-flowing particles of sand individually coated with a solid and non-tacky layer of a thermosetting resin material composed of acid-catalyzed phenol-formaldehyde resin including and partially reacted with hexamethylene tetramine.

13. As a dry, free-flowing, granular composition of matter, a mass of discrete and free-flowing particles of sand individually coated with a solid and non-tacky layer of a thermosetting resin composed of alkaline-catalyzed phenol-formaldehyde resin.

14. As a dry, free-flowing, self-bonding granular composition for forming into foundry casting molds and the like while in said dry and free-flowing state, discrete and free-flowing particles of sand individually coated with a solid and non-tacky layer of a thermosetting resin material composed of acid-catalyzed 2-step phenol-formaldehyde resin including and partially reacted with hexamethylene tetramine.

15. As a dry, free-flowing, granular composition of matter, a mass of discrete and free-flowing particles of sand individually coated with a solid and non-tacky layer of a thermosetting resin composed of alkaline-catalyzed 1-step phenol-formaldehyde resin.

16. As a dry and free-flowing granular composition for forming rigid foundry casting molds and the like, a free-flowing mass of non-tacky sand granules wherein each granule of sand is separate from adjacent granules and wherein said sand granules are individually coated with a thermosetting resin binding material non-tacky at room temperatures but becoming tacky at elevated temperatures before setting, said binding material being in films completely enveloping individual said sand granules, and said coated sand being convertible without application of external pressure into a strong rigid mass by application of heat sufficient to set said binding material coatings and to coalesce said coatings at points of contact among said granules for binding said granules together into a rigid mold structure.

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